

FARRUKHABAD DISTRICT
A STUDY IN RURAL SETTLEMENT GEOGRAPHY

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INTRODUCTION

The process of economic development aims not only at increasing the levels of national income but also at the improvement in the quality of life and its people. While in the past, a rise in the level of national income was considered synonym for the improvement in the living standard of the people, the recent experiences have proved that it has widened the gap between the rich and the poor and has led to the concentration of economic power in the hands of a few. Therefore special efforts are needed to improve the quality of life of the common people by improving their working and living conditions along with the provision for health protection, education and everything that promotes all round development of man. This, in other words, means that efforts should be made to improve the environment around the man. This environment is divided into three broad categories : (i) biological, (ii) physical, and (iii) built environment. So far, much research has been done on various aspect of biological and physical environment but not much attention has been paid to various aspects of the built environment although it is the most important factor which has a direct bearing on the quality improvement of life in the settlements especially in the rural areas. In the present monograph a modest attempt has been made to study the present status of the built environment in the rural areas of Farrukhabad

district, and suggest ways and means to improve its quality.

The 'built environment' a synonym for 'settlement' largely consists of houses, highways, fields, parks, playgrounds etc. The word 'settlement' has a broad meaning which refers to an 'organised colony of human beings ranging from a simple farm ~~steed~~ to a highly complex city or megalopolis and from a temporary camp of miners or hunters to more sedentary houses of farmers and city dwellers, (Tiwari, 1969, p. 69). It denotes the process of settling (colonizing) of an area as well as its end product. Though there is frequent reference of settlements and their associated features in the ancient literature of religion and philosophy their scientific study began with Carl Ritter's work in the early part of the 19th century. Later on Kehl, Richthofen, Ratzel, Meitzen, Grandmann, Martiny, Christaller and Nitz in Germany; Blache, Brunhes, Demangeon and Blanchard in France; Lefevre in Belgium; Aurousseau in Austria; Ahlmann in Scandinavia; Houston, Chisholm and Haggett in Britain; Bowman, Hall, Stone, Jordon and Hudson in the United States; Bylund and Hagerstrand in Sweden, Ahmad and Singh in India; and Doxiadis in Greece have made significant contributions to the field of settlement studies.

RURAL SETTLEMENT GEOGRAPHY IN INDIA :

In India rural settlement geography has a late start

probably dating back to the early part of the 20th Century when Subramanyam (1976, pp. 118-122) made his pioneering study in this field. But the progress has not been very encouraging till the Ph.D. dissertation of Ahmad in 1949. His articles on various themes of the discipline during sixties encouraged young geographers to focus their attention of this promising field of geography. The subject got further impetus during the inspiring leadership of Prof. R.L. Singh during the following decade when his first article on the 'Meaning, objectives and scope of Settlement Geography' (1961) and the IGU commission on 'Rural Settlements in Monsoon Asia' (1968) under his Chairmanship revolutionised the discipline. Since then a number of research monographs, Ph.D. dissertations and articles have been published on various aspects of the subject whose reviews have appeared in 'Fifty years of Sciences in India: Progress of Geography' (1964 and 1968), I.C.S.S.R's 'Survey of Research in Geography' (1972 and 1979) I.C.S.S.R. Journal of Abstract and Reviews in Geography.

A closer look of this growing literature shows that most of these studies have been repetitive in nature putting emphasis on historical and morphological aspects but exhibiting scant attention for functional, sociological and development attributes of the settlements. Researchers have generally based their deductions on the secondary sources of data

rather than going for rigorous field-work or tapping the primary sources of the data. In the present monograph an attempt has been made to remove some of these shortcomings and give a new guidelines to the rural settlement studies so as to make them more meaningful and utilitarian to the rural society specially to the rural poors.

OBJECTIVES OF THE PRESENT STUDY :

The subject of the present monograph arises out of the author's interest of studying the characteristics of rural settlements in an old settled region like Farrukhabad. The region has a systematic cultural history right from the Mahabharat period passing through several phases of growth and decline in settling process. For many centuries Kannauj (old name Kanyakubja) became the hub of the political power and economic prosperity in the entire northern India attracting hordes of invaders to plunder its wealth and treasure. Consequently Kannauj was built and rebuilt several times each leaving an imprint of its own over its econo-socio cultural environment. This complex cultural history is not only responsible for preserving India's unique culture and its heritage but has led to the formation of a slow moving and tradition bound society which is less receptive to new socio-economic changes. Hence it is necessary to examine the retrospect and prospect of rural settlements in such surroundings particularly at a time when the country is formulating its strategies for the 21st

century. The study, therefore, attempts (1) to take into account the physical and human resources of the region (Chapters 1 and 2), to examine the settlement history and the colonization process (Chapter 3), to analyse the spatial patterns of present day settlements and their types (Chapter 4), to examine the internal morphology of the villages and their shape characteristics (Chapter 5), to throw light on the salient features of rural dwellings and their broad regional types (Chapter 6), to identify the rural service centres and their tributary areas (Chapter 7), and to chalk out strategies for formulating comprehensive plans for evolving an integrated spatio-functional system, accelerate the pace of economic development and improve the socio-economic lot of the rural poor (Chapter 8).

The entire theme divided into 8 Chapters (1. Geographical settings, 2. population pattern, 3. Evolution, 4. Spatial distribution and types, 5. Morphological structure, 6. Rural dwellings, 7. Functional organisation, and 8, Planning and rationalisation) aims at testing the validity of the following hypotheses.

1. That rural settlement is an integral part of the physico-cultural environment of the region.
2. That the region has rich natural resources in the

form of level plains and fertile soils which have attracted hordes of settlers ever since the dawn of the human civilization.

3. That the evolution of rural settlements is largely determined by historico-cultural processes passing through several phases of growth and retrogression.
4. That while the physical factors including defence have played major roles in the selection of initial sites for the settlements, the paucity of space, development in the means of transport and communication, and new fiscal reforms have encouraged dispersal tendencies in recent years.
5. That the internal morphology of the village is influenced by the socio-cultural processes in which caste system plays an important role.
6. That most of the settlements have been evolved as clan centres and so there existed intimate relationship between clan areas and administrative units in the past.
7. That majority of the villages have rectangular to polygonic shape showing their suitability for hexagonal pattern of planned development.
8. That rural houses have been built up by the cheap local material without proper planning for sanitation and health care.

9. That existing pattern of rural service centres is the outcome of transport development exhibiting uneven distribution and spatio-functional gaps.
10. The rural area is a caste ridden society where economic power is derived from social power. It has a large number of poor and socially degraded people who are unable to meet their basic requirements of life.
11. That no rural planning can yield fruitful results unless it improves the socio-economic conditions of the poor masses, evolves an integrated spatio-functional system and guarantees greater autonomy to village panchayat and similar organisations to formulate their own plans and involve all sections of the village society.

METHODOLOGY :

Data collection : All the data concerning the present monograph have been collected through five major sources: (a) written records, (b) archaeological evidences, (c) place names, (d) field surveys, and (e) maps.

Written records include various editions of District Gazetteers of Farrukhabad district (1884, 1911, 1916, 1925), Settlement Reports (1803, 1806, 1809, 1813, 1836, 1845, 1870, 1902, 1911), District Census Handbooks

(1951, 1961 and 1971), historical and travel descriptions, survey reports, Zila Sankhikiya Patrika, Zila Varshik Yojna, etc. These may be consulted from the state archives, revenue record rooms of the district and tahsil headquarters, government offices and libraries, etc. Persons belonging to the ruling families of Kannauj, Farrukhabad, Shemsabad (Khor), Tirwa etc. preserve many hand written documents and sanads issued by erstwhile rulers which throw sufficient light on the cultural history of the region including the founding of new settlements.

Archaeological evidences are scattered all over the region in the form of various Kheras of which the excavations at Kannauj are of great importance and have yielded valuable details regarding the historicity of the place.

The study of place names (Chapter 3) of the villages and folk lores etc. have yielded interesting details about the successive stages in the evolution of rural settlements in the region. During the course of his field work in 1984 and 1985 the author has visited various important places of the district and has conducted indepth surveys of 20 sample villages for studying their field patterns, land ownership, morphological structure, socio-economic characteristics and colonization process, etc.

He has also interviewed some of the descendants of erstwhile rulers, clan chiefs, zamindars, talukdars etc. to study the settling process and the diffusion of Rajput clan settlements. .

While topographical maps on the scales 1:250,000; 1:63360 and 1:50,000 have formed basis for analysing the distributional patterns of settlements in the region; the cadastrel maps (Scale 16" = 1 mile or 1:3960) from revenue department have been utilised for the study of field patterns. Similarly tahsil maps showing village boundaries in District Census Handbook, 1971 are very useful for 'nearest neighbour' and shape analyses. Valuable co-operation has also been received from the District Statistical Office, Farrukhabad and concerned departments to obtain maps showing roads, electricity lines, soil types, agricultural landuse, social amenities etc. It is regrettable that despite ~~earned~~ efforts the author could not procure aerial photographs of the region owing to strict restrictions imposed over their sale and use.

DATA ANALYSIS AND INTERPRETATION :

The method of analysis used in the present monograph utilises simple statistical techniques supported by maps diagrams and tables. Blocks (Vikas Khand) have been chosen as the basic unit for study, but Adalat Panchayat level analysis has also been attempted at various places to obtain

more details. (Care has been taken to select sample villages giving adequate representation to all parts of the study area.

The main headings, figures and tables all bear Chapter number while references to the literature cited have been arranged in the Harvard Style : (a) in the text within bracket : author's surname, year and page, (b) at the end of the each chapter in the alphabetical order - name and initials of author, year of publication, title of the book, article, journal, place of publication and publisher etc., photographs (Plates, 1-28) taken during the field-work depict the physical, economic and social conditions of the villages and their inhabitants while large tables have been arranged in the form of three annexures at the end of the monograph.

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CHAPTER 1GEOGRAPHICAL SETTING1.1. SPATIAL RELATIONSHIPS :

Farrukhabad district ($26^{\circ}45'45''$ N - $27^{\circ}42'45''$ N latitude and $79^{\circ}10'45''$ E - $80^{\circ}6'6''$ E long) occupying the Central part of the Ganga-Yamuna Doab is located on the north-western corner of Allahabad Division. It is a medium sized district in the state of Uttar Pradesh, covering a total area of 4349 km.^2 (rural area being 4311 km.^2) and a shape of irregular parallelogram (north-South maximum length being 122 km. and east-west breadth being 64 km.). The district is bounded by Etah and Mainpuri districts in the West, Budaun and Shahjahanpur in the north, Hardoi in the east and Etawah and Kanpur in the south and south-east respectively. Administratively it is sub-divided into four tahsils (Kaimanj, Farrukhabad, Chhibranau and Kannauj), 14 community development blocks, 168 nayaya panchayats, 1209 gramsabhas and 1771 revenue villages (Fig. 1.1).

1.2. STRUCTURE AND RELIEF :

Being ~~the~~ part of the Ganga-Yamuna Doab, Farrukhabad district consists of level plain formed by the alluvial deposits of the Ganga and its tributaries (Mukerji, 1964) since Pleistocene period. The homogeneity of the relief

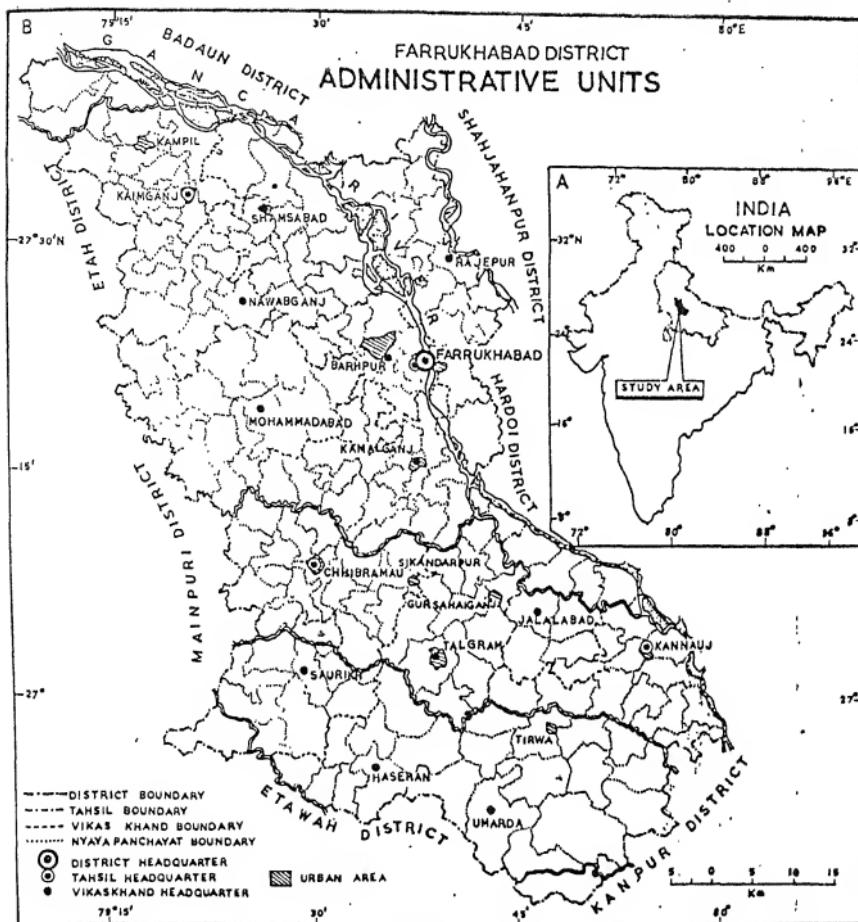


FIG. I-I

is broken by a few gentle undulations formed by the levees and shifting courses of the streams. The highest elevation has been found near Mohammadabad (167 m) whereas Rajipur exhibits the lowest height (143 m) above sea level. The general slope of the district runs from north-west to south-east, with an average of 20 cm per km. (Tiwari, 1984, p.4).

1.3. PHYSIOGRAPHIC REGIONS :

Based on the quality of the alluvium the district may be safely divided into two physiographic regions : (i) the upland or the Bangar, which is a continuation of the Dosh plain, and (ii) the low land or Khadar plains.

1.3.1. The Upland Plains :

It covers the whole of the northern, western and the southern part incorporating about 3535 km.² (80%) of the district's area. It is further divided into four parts of Ganga and its tributaries - Bangar, Kalinadi and Isan. Along the bank of these rivers, there lies a strip of land of varying width, flooded by the river during the rainy season and is called 'Khadar'. From it rises an abrupt sandy slope, followed by ravines which carry off the surplus drainage making way to an undulating strip of firmer sandy soil. Further inland is a belt of loam or 'dumat' beyond which lies the watershed, a tract of grey saline plain, interspersed with oases of cultivation

and shallow lakes.

But unlike other areas in the northern region lying between the Ganga cliff and the Bangar lands, usar lands are totally absent. It is replaced by the yellow coloured soil called 'Bhur', which contains qualities of loam and sand.

The whole upland region is well drained and the rivers have made it much fertile and well suited to agriculture.

1.3.2. The Low Lands :

The low lands, known as 'Khadar' or 'Tarai' (Plate No.2) is separated from the upland (Bangar) by a high ridge, which earlier formed the bank of the Ganga. From Farrukhabad till Chandapur Bangar (north of Kannauj) a cliff governs the flow of the Ganga. North of Farrukhabad city and south of Chandapur Bangar Ganga flows freely, giving birth to numerous small depressions, lakes and ponds etc. The low lands are well developed in Rajepur block where the Ganga along with Ramganga have numerous tributaries and connecting channels causing immense flooding and erosion during rainy season.

1.4. DRAINAGE :

The Ganga (Plate No. 1) and its numerous tributaries like Ramganga, Burhiganga, Kalinadi, Isan, Arind and Pandu (fig. 1.2) etc., form the drainage channel of the district.

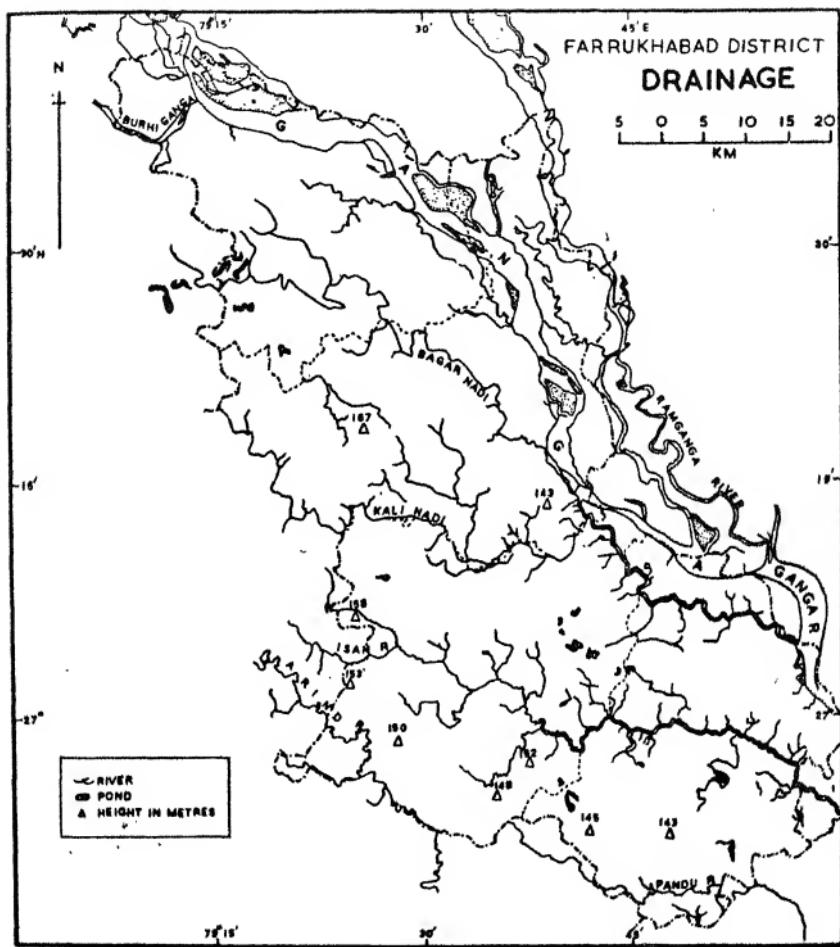


FIG. I-2

They all have a general flow from north-west to south-east. Entering from the north-west corner, the river Ganga makes the greater part of the northern and eastern boundary of the district. The river has been constantly changing it's course swinging in its wide valley. Today Fatehgarh, a suburb of Farrukhabad, is the only town situated along its right bank while old towns like Kampil, Kaimganj, Kannauj, Chilsara and Shamsabad (Khor), situated along the old bank have been deserted by the river.

Ramganga is the principal tributary of the Ganga in the study area. It forms the north-eastern boundary of the district and is notorious for its shifting courses and flood damages. Unlike the Ganga it is liable to sudden and complete changes in its course and travelling over kilometres in its wide valley. When swollen with rains, the two rivers from both the sides cause immense damages to life and property in Rajepur block, restricting the growth of large villages in their command area, (Plate 26 & 27).

Kalinadi and Isan are fit to act as outlets for collected rain water in the central and southern part of the district. With sinuous channel and shallow bed Banarnadi is naturally incapable of carrying off the water which flows in it. In rainy season it carries a large amount of water but goes dry during summer months. Burhi-ganga occupies an old bed of the Ganga. Other rivers like

Pandu and Arind have very short courses in the district.

Apart from rivers, the lakes or 'jhils' also constitute an important aspect of the drainage system of the district. Such stretches of water are noticed in Usar plains, mostly in Kaimganj and Chhibramau tahsils of the study area. Talgram literally means ' a village of ponds', it is centrally situated in an area looking like a huge lake during rainy season. This water is widely used for irrigation purposes in the area. Important 'jhils' include Nigoh, Kaint, Bhagel, Bholani, Amwani, Batatal, Dadartal and Dadarjhil, etc.

1.5. CLIMATE

The climate of Farrukhabad district belongs to tropical Monsoon type (Cwg of Koppen, CA'W of Thornthwaite and Caw of Trewartha). It is marked by three distinct seasons - the winter (dry, cool days and chilly nights) from the end of October till February, the summer (scorching heat, hot winds namely 'loo' and dust storms) from March till mid June, and the rainy (uncertain rain, pleasant weather after rain otherwise sultry) from mid June till the end of October. Due to absence of climatological observatory in the district it is somewhat difficult to give more details regarding the weather elements.

1.5.1. Temperature :

The region enjoys fairly high temperature throughout the year recording a maximum of 42°C in May and early part of June when scorching heat of the sun becomes unbearable and fierce dusty winds called 'loo' make the out door activities difficult. But in January, the coldest month, mercury falls down to 9°C making the night chilly and cold accompanied with frosts and fogs. With the arrival of monsoon (July) a sudden fall in maximum temperature of $6-8^{\circ}\text{C}$ is observed but the increase in atmospheric humidity makes the weather sultry and muggy.

1.5.2. Pressure and Winds :

In winter season the study area comes under the impact of a wedge of seasonal high pressure area situated over Pakistan and extending over the entire Ganga plain along the foot hills of the Himalayas. During December and January, the pressure generally remains around 1017 mb. While during summer season an extremely low pressure area occurs over the district (in May and June the pressure varies between 998 and 1001 mb.). During the intervening period of these two extremes pressure generally remains moderate, ranging between 1004 and 1012 mbs.

From June to September the direction of winds is mainly easterly or north-easterly, while in remaining period of the year it blows from west to east. The wind speed is

fatest in May and June when sometimes it turns into dust stroms of more than 100 km. per hour.

1.5.3. Rainfall :

The average rainfall recorded during the last ten years in Farrukhabad is 103 cm. It is characterised by wide fluctuations from year to year, e.g. 109 cm. in 1978 and 55 cm. in 1979. More than 90% of rainfall is caused by summer monsoon coming from the Bay of Bengal, which normally breaks here in the third week of June and lasts upto the end of October. January also receives a little amount of rainfall, less than 2 cm. by the western disturbances, which is very beneficial for Rabi Crops. But rain during March and April are sometimes accompanied by hail-stroms which cause immense damage to standing crops.

1.6 SOILS :

Soils of Farrukhabad district mainly belong to three types : 'dimat' or loam, 'matiyar' or clay, and 'bhur' or sandy. In a more scientific study carried out recently by Mehrotra and Gangwar, the district has been divided into four major soil regions and seven sub types (Table 1.1, Fig 1.3B).

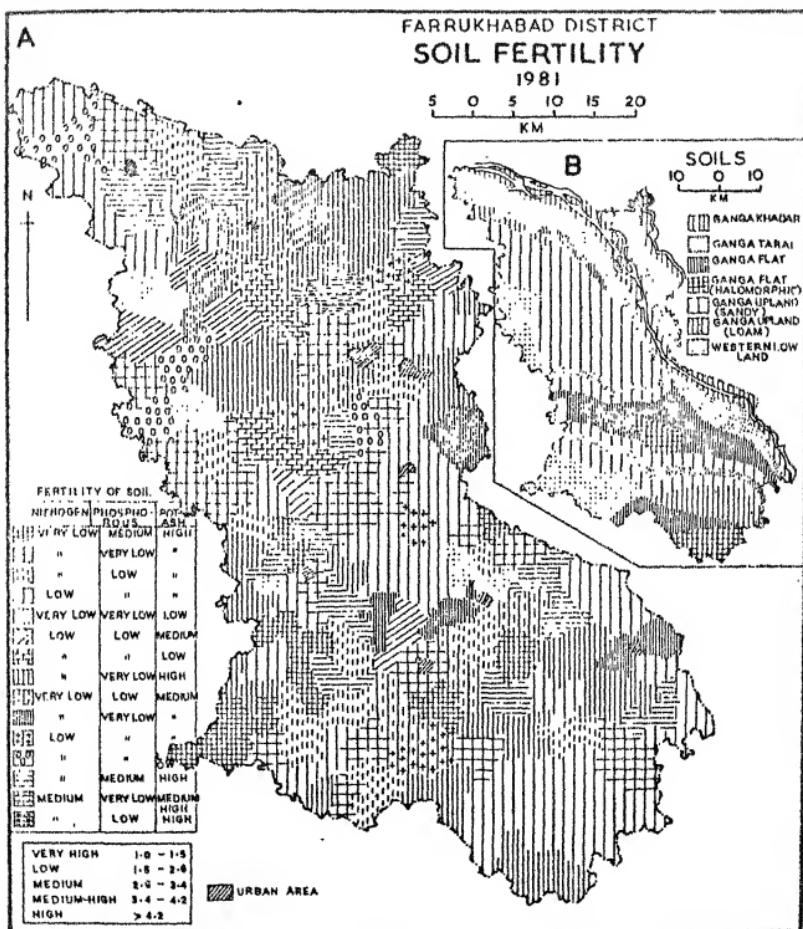


FIG. I-3

TABLE 1.1. MAJOR SOIL TYPES.

SOIL TYPES	SOIL REGIONS	SERIES
I	Recent Alluviums	1. Ganga Khadar 2. Ganga Tarai
II	Flats	3. Ganga Flats 4. Ganga Flats (Halomorphic)
III	Uplands	5. Ganga Uplands (sandy) 6. Ganga Uplands (loam)
IV	Lowlands	7. Western lowlands

Ganga Khadar and recent alluviums occupy the area within the flood limits of the rivers like Ganga, Ramganga, etc., and are enriched by the fresh deposits of the silt every year. They are sandy to sandy loam in texture and light grey in colour. Besides growing melons and vegetables during summers they produce inferior crops like jowar, bajra, arahar, gram, etc.

Ganga flats occupy a narrow belt in the central part of the district and lies beyond the flood limit of the rivers. The soil is loamy with grey to brownish colour.

Ganga Uplands contain soils of greater maturity and old alluviums which are brown to reddish brown in colour and sandy to sandy loam in texture. They are neutral to slightly acidic in nature with poor organic matter. This soil type occupies major part of the district area and grows all sorts of crops.

Soils of Ganga lowlands occupy the western and south-western corners of the study area. (Fig. 1.3B). They are grey to ash grey in colour and loam to clayey loam in texture. Such soils are very rich in lime and contain big sized 'Kankar' deposits. Occupying the low lying areas they are well suited to paddy crops.

Figure 1.3A, clearly exhibits the low fertility of soils in Farrukhabad district which are deficient in calcium, organic matter and nitrogen and are susceptible to soil erosion. Hence, there is a need for popularising the use of organic manures, chemicals (fertilisers and soil conservation practices.

1.7. NATURAL VEGETATION :

Prior to the Aryan colonization the district was densely covered with thick forests, which were gradually removed due to the expanding frontiers of agriculture and man's economic activities. So much so that there is hardly a place in the study area where natural vegetation has been preserved in its primitive wild form. However, the district presents a well wooded appearance owing to the presence of groves more so in the southern blocks like Umarda, Talgram and Haseran.

The district forest department commands 4195 hectares of land (0.97% of the study area) which includes

the trees of economic importance on 255 hectares and 266 km. patch along the roads. The former covers a large proportion of grove land along the old Ganga cliff, and in Umarda, Telgram, Haseran, Saurikh and Barkpur blocks, where the soil is poor and furrowed with ravines growing trees like babul, tamarisk, (acacia arabica) and dhak (butea frontdosa) etc. On the other hand the trees of sisam (dalbergia), mango, neem, pipal (ficus religiosa) and ber (zizyphus mauritiana) are planted along the roads and canals.

1.8. LAND USE :

Farrukhabad district like other parts of the Ganga plain shows an over all predominance of agriculture in its land use. The ever increasing demands of food for feeding fast growing population not only denuded the forest cover from the area jeopardizing the ecological balance but the increasing demands for transport, communication and housing activities are gradually eating away the fertile agricultural lands.

Table 1.II shows the land utilization in the study area. Out of the total area of 426,729 hectares 5.2% is not suitable for cultivation and is mostly occupied by ravines and 'usar' lands. This percentage is maximum in Umarda (11.4), and Rajepur (9.3), while Haseran block records the minimum (0.9). Another 9.3% land is put to

TABLE 1.II
LAND UTILIZATION, 1981-82 (in per cent)

Blocks	Barren & unculti- vble land	Land under non- agricul- tural uses	Forests groves & pastures	Culti- vble wastes	Fal- low land	Net sown area
Kaimganj.	1.5	14.7	1.2	7.0	13.3	62.3
Nawabganj	5.6	5.6	2.3	8.8	9.1	68.6
Shamsabad	3.5	18.6	3.6	3.9	8.1	62.3
Barhpur	2.1	10.1	4.3	4.9	9.9	68.7
Rajepur	9.3	15.5	1.0	3.8	15.0	55.4
Mohammadabad	5.8	5.6	3.6	6.9	11.6	66.5
Kamalganj	4.4	6.8	3.7	2.5	10.3	72.3
Chhibramau	2.8	5.8	3.3	2.5	9.9	75.7
Talgram	3.2	5.4	5.5	5.4	11.5	69.0
Saurikh	4.9	5.8	6.0	5.9	10.4	67.0
Haseran	0.9	6.0	7.6	9.8	10.4	65.3
Jalalabad	5.4	7.9	4.0	5.2	7.0	70.5
Kannauj	5.3	12.1	3.2	3.0	9.2	67.2
Umarda	11.4	7.2	8.4	4.9	10.1	58.0
 District						
Farrukhabad	5.2	9.3	4.2	5.2	10.6	65.5

Source : Based on Zila Sankhikiya Patrika, Farrukhabad.

non-agricultural uses like residences, factories, roads, canals and burial grounds, etc. This ratio is higher than the district average in five development blocks, i.e., Shansabad (18.6), Rajepur (15.5), Kaimganj (14.7), Kannauj (12.1) and Barhpar (10.1), while six western and southern blocks of the district, i.e. Talgram, Nawabganj, Mohammadabad, Chhibramau, Saurikh and Haseran have 5-6% of the area, under non-agricultural uses. The pastures including the forests and groves occupy only 4.2% of the region's area, the maximum being in southern blocks - Umarda (8.4), Haseran (7.6) and Saurikh (6.0).

The land which could be brought under cultivation, with a little bit of efforts, amounts to 5.2% showing its highest concentration in Haseran block (9.8) followed by Nawabganj (8.8), Kaimganj (7.0) and Mohammadabad (6.9) etc., while Kamalganj and Chhibramau blocks (2.5 each) record the lowest percentage. Fallow lands which may well be utilised for agricultural purposes, constitute 10.6% of the district's area (Fig. 1.4). Their maximum concentration is noted in Rajepur block (15.0) where flood havoc is very common followed by Kaimganj (13.3), Mohammadabad (11.6) and Talgram (11.5) blocks. The net sown area covers about two-thirds (65.5%) of the regions area of which 48.9% produces more than one crop. On block basis Chhibramau records the highest percentage of net cropped area (75.7) followed by Kamalganj (72.3),

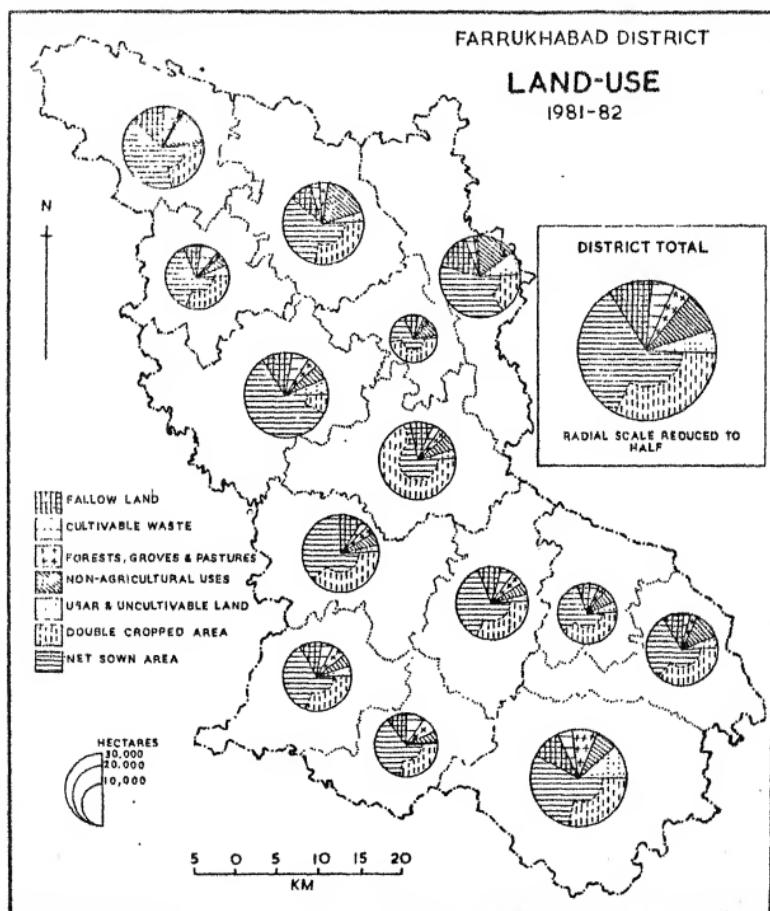


FIG. I-4

Jalalabad (70.5) and Talgram (69.0). On the other hand Rajepur (55.4) Umarda (58.0), Kaimganj (62.3) and Shamsabad (62.3) blocks, lying in flood prone and water logging zone, have the lowest percentage of net cropped area. The high proportion of agricultural land very well prove that there is very little scope for increasing the cropped area. In fact owing to the mounting pressure of population and greater demands for houses, factories, transport and communication, etc., area under agriculture is gradually decreasing in recent years. Hence, there is a need to put emphasis on intensive farming and multiple cropping. Also in order to maintain ecological balance and popularise soil conservation measures plants and trees may be grown along the railways, roads, rivers, canals and in waste lands of the villages.

1.9. AGRICULTURE :

Agriculture is the principal source of livelihood covering two-third of region's area and engaging over two-third of its population. Though district's agriculture suffers from all those maladies which are part and parcel of India's Traditional agriculture, but its condition is slightly better off owing to the cultivation of cash crops like potato, maize, sugarcane, tobacco, ground nut, etc., which play a significant role in the improvement of economic conditions of the farmers. Though the use of new varieties of seeds, chemical fertilisers, insecticides

and farm machineries is increasing day by day but certain ills like poverty, illiteracy, wrong notions and unequal distribution of land resources, etc. need our immediate attention to give boost up to district's agriculture. Farmers have plenty of leisure during the year which may be utilised in agro-based cottage & village industries, dairy farming, pisci-culture, seri-culture etc. (Fig. 1.5A).

1.9.1. Cropping Pattern :

Though foodgrains like wheat, maize and rice, etc., occupy over 70.2% of total cultivated area of the district (1980-81), but unlike other parts of the Doab it is also famous for various cash crops, like potato, sugarcane, tobacco, groundnut etc. Of the three main cropping seasons Rabi (53.4%) and Kharif (43.7%) are very important. Amongst the Rabi crops wheat occupies the largest area (32.1%) followed by potato (9.2%) and pulses (7.6%). Similarly main Kharif crops include maize (19.6%), rice (7.8%), bajra (5%) and sugarcane (1.6% of the total cultivated area). Zaid crops largely consist of tobacco vegetables and melons.

1.9.2. Cropping Intensity :

The region has witnessed a phenomenal increase in double cropped area during last three decades. That is why cropping intensity which was merely 118.9% in 1950-51 rose upto 144.3% in 1978-79. This statement is further corroborated from the fact that the net

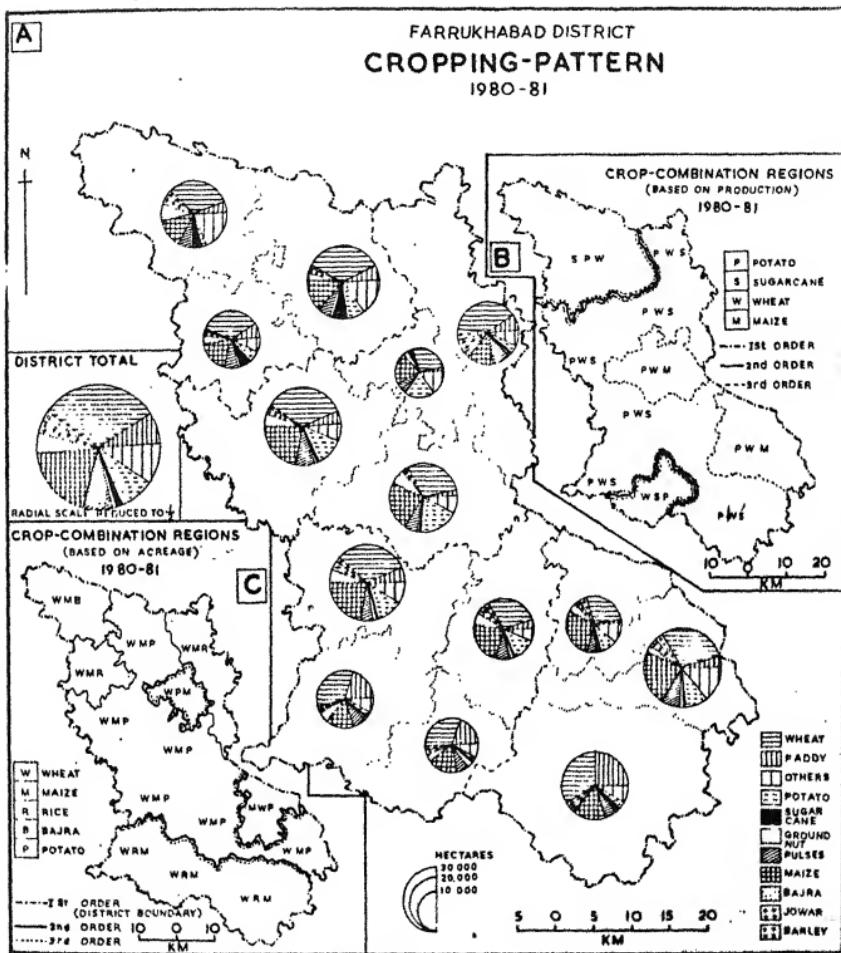


FIG. 1-5

cropped area recorded an increase of only 5.6% during 1950-1979 (1.01% decline during 1972-79), but the double cropped area increased by 147.4% during this period.

(a) Wheat :

Wheat is the principal staple crop of the area. It is grown singly and in combination with barley and gram, on about one-third of the total cultivated land of the region. Highest percentage of its cropped area comes from Rajepur (38.9) block, while Barhpur (27.1) occupies the lowest place, whereas former is a grain dominated area, the latter grows sufficient amount of cash crops like potato, maize, tobacco, etc. In terms of acreage it ranks ~~the first crop~~ in all but Jalalabad block, where it occupies second position after maize (Fig. 1.5C). The total production of wheat during 1980-81 was 215367.2 tonnes on the basis of which it stands first in one block, second in ten and third in three blocks (Fig. 1.5B).

(b) Maize :

It is the second important food crop after wheat and covers about one-fifth of the total cultivated area of the region. In Jalalabad block it occupies the foremost position covering 28.6% of its cultivated area, while Rajepur

records the minimum (14.1%). It ranks first in one, second in nine and third in four blocks. The total production of maize during 1980-81 was 44236.6 tonnes, which enables it to rank third in three blocks of the study area.

(c) Potato :

It is the leading cash crop of the study area for which Farrukhabad is famous throughout the country. Though in terms of acreage it covers only 9.2% of the total cultivated area, but in respect of production (86,370 tonnes during 1980-81) it leaves behind all other crops. Barhpur and Kamalganj, with well manured soils, are two largest potato producing blocks of the study area. Farrukhabad supplies potato to all parts of the country but sometimes non-availability of railway wagons creates a sudden glut in local market and deprives farmers from remunerative prices. Hence, while improving existing transport facilities those industries must be installed within the district which could utilise potato and its by products.

(d) Rice :

It is fourth important crop occupying 7.8% of the region's cropped area. Its main concentration is found in the southern blocks-Umarda

(24.7%), Saurikh (19.4%) and Haseran (19%) where apart from canal irrigation, clayey soils and lowlying tracts are well suited to the cultivation of this crop (Fig. 1.5A). Nawabganj (8.5%) and Rajepur (8.3%), lying in flood-prone zone, represent another source of rice where its acreage is higher than the district average. On the basis of its cropped area, rice is the second ranking crop in three blocks, and third in two blocks. The total production of rice during 1980-81 was 32,022 tonnes.

(e) Other Crops :

Among other crops mention may be made of pulses (Rajepur, Mohammadabad and Talgram) Juar-Bajra (Kaimganj, Talgram, Rajepur and Chhibramau), Barley (Rajepur, Jalalabad and Kannauj), Sugarcane (Shamsabad, Nawabganj and Kaimganj), Tobacco (Kaimganj and Shamsabad), peanut (Haseran and Kannauj) and fruits (Kaimganj vide Plate No. 3), etc., whose cultivation is carried on in different parts of the study area.

1.9.3. Crop Combination Regions :

Crop combination regions identified on the basis of 'areal dominance of crops' (Dayal, 1967, p.39) or "the percentage of the total harvested crop-land occupied by individual crops" (Shafi, 1968, p.37) is another method of

examining the cropping pattern in an area. Based on the percent acreage of individual crops two first-order (wheat and Maize), four second-order (wheat-maize, wheat-rice, wheat-potato and maize-wheat); and six third-order (wheat-maize-potato, wheat-rice-maize, wheat-maize-rice, wheat-potato-maize, maize-wheat-potato, and wheat-maize-bajra) regions (Fig. 1.5C) have been identified in the study area. Out of most important crops of the district wheat and maize are predominant in all the fourteen development blocks, while potato, as second (1) and third (7) ranking crop, finds place in 8 blocks. Similarly rice, as second and third ranking crop, is dominant in 5 development blocks leaving only Kaimganj block to give third rank status to bajra.

An attempt to rank crops on the basis of crop-output yields altogether different results. This gives as three first-order (potato-sugarcane and wheat), three second-order (potato-wheat, sugarcane-potato and wheat-sugarcane), and four third-order (potato-wheat-sugarcane, potato-wheat-maize, sugarcane-potato-wheat, and wheat-sugarcane-potato) (Fig. 1.5B).

1.10. IRRIGATION *

The unreliable and seasonal rainfall force farmers to tap artificial sources of water to carry on agricultural practices throughout the year. Due to lack

of such facilities in the past, the area has experienced numerous draughts, which have taken a high toll of cattle and human life. But the rapid development of tubewells and canals has greatly reduced the possibility of famines in the region. So much so that vegetable crops like potato, which requires 9 waterings, is solely dependent on tubewell irrigation. Similarly with the digging of canals, in the second half of the last century, the region witnessed phenomenal rise in its agriculture when its total sown area increased from 219,117 heccts (1833-39) to 255,505 heccts. (1881-85). Similarly the electricity reaching the villages, after independence, and the use of diesel in energising state and private tube-wells made tremendous impact in augmenting the irrigation potential and reducing the severity of draughts and famines. At the time of the introduction of tubewells, the total cultivated area, in the district, was 325, 340 heccts. (1951) which rose to 416,468 heccts. by 1981-82. The total irrigated area has recorded a net increase of 44.74% during 1902-82.

Figure 1.6A, showing different sources of irrigation in 1981-82, clearly exhibits that 62.6% of region's cropped area is now enjoying the facilities of irrigation. The percentage share of irrigated area to cropped area is maximum in Barhpur (71.9), Mohammadabad (71.5) and Nawabganj (71.1) blocks, which are incidentally main potato and

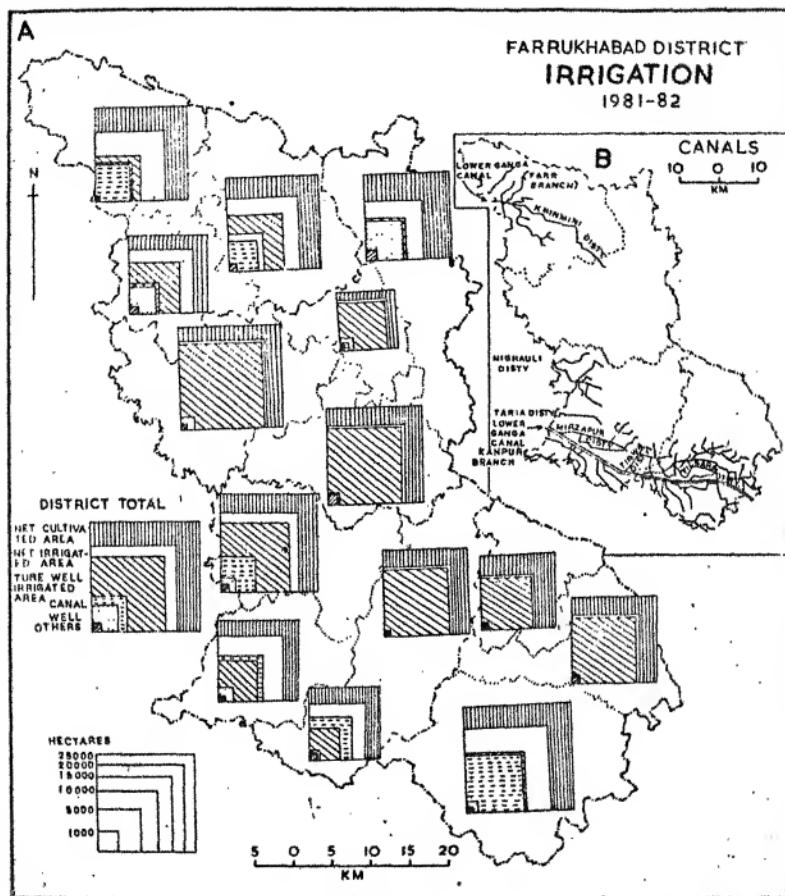


FIG. I-6

sugarcane growing areas of the district, Rajepur with the minimum percentage of irrigated land (45.2) is over flooded by the Ganga and the Ram Ganga rivers and has comparatively less requirements for irrigation water. Canals, tubewells and wells are the main sources of irrigation in the study area.

(a) Canals :

With the completion of Kampur branch of the lower Ganga canal in 1854, the canal irrigation was introduced in the study region. This canal passes through the southern blocks of the district covering a total length of 56 km. Together with its five distributaries and minors, the total length goes up to 302 km (Fig. 1.6B). The northern part of the district is served by the Farrukhabad branch (22 km in study area) of the Lower Ganga Canal which was opened in 1881. With its seven distributaries the total length of the canal in the district is 55 km. The Mighauli distributary of Bewar branch (17 km) with its six minors (28 km.) serves the north-western corner of Chhibranau tahsil (Fig. 1.6B).

Canals, which irrigated 33.7% (25,134 hectares) of the total cropped area, in the beginning of the present century, lost their percentage share to only 10.9 (30,557 hectares) by 1981-82 due to phenomenal growth of tube well irrigation during

recent years. Today Haseran, Saurikh and Umarda blocks are benefitted by canal irrigation whose percent contribution to total irrigated area comes to 61, 51.3 and 46 respectively.

(b) Tube Wells :

At the time of independence (1947-48), when electricity had not reached the villages, tubewells irrigated only 19 hectares of the cropped area of the district. The figure rose to 200 hectares by 1950-51 and 126,690 hectares (45.3% of the net sown area) by 1981-82. Till March 1980 the district had 378 government tubewells besides 29839 private tube wells and pumping sets which together irrigated 72.4% of the total irrigated area of the district. On bleak ~~wise~~ basis Talgram (98.3%), Mohammadabad (97.6), Kamalganj (96.4) and Jalalabad (95.9) are well placed in respect of tubewell irrigation. There is no government tubewell in Saurikh, Haseran and Umarda blocks which are benefitted by canal irrigation. Similarly Rajepur block, lying in the flood affected area, is also not advantageously placed in respect of tubewell irrigation.

(c) Wells :

With the introduction of new sources of irrigation (canals and tubewells), the well irrigatio

is gradually losing its importance. The traditional methods of 'dhenkali', 'rahat' and 'Charas' are now being replaced by tubewells and pumping sets using electric or diesel operated engines. Well irrigation is practised in such places like Rajepur, Mohammadabad, Chhibramau, Talgram and Saurikh blocks, where the supply of electricity is not easily available. In March 1980, there were 12,643 wells and 11,736 'rahats' irrigating about on 19,842 hectares (7.3% of the net sown area) while during 1985-8 they irrigated a total of 86,317 hectares (31.8%). During 1980-82 the figures dropped down to 15,511 hectares (5.5% of the net sown area). Their contribution to the total irrigated land is just 8.9%, being maximum in Rajepur (46.5%) followed by Kaimganj (27.4%) and Shamsabad (24.3%) blocks.

1.11. MINERALS AND RAW MATERIALS :

Farrukhabad district lacks mineral products. In clay tracts limestone is found in block or nodular form (Kankar) which is used in the construction of roads and buildings. But its use is day by day decreasing with the popularity of cement and sand stone etc.

Saline tracts provide 'shora' (salt petre) and 'lohma' (salt) which were manufactured into common salt

at Bhawalpur Mistini near Kampil, during the olden days but same has been now prohibited under the new salt law. 'Khari' (sulphate of soda) soil mainly occurs in Kaimganj and Rajepur blocks, while 'reh' (sodium carbonate) is found in Usar tracts, and is used by poor washerman as substitute for soap.

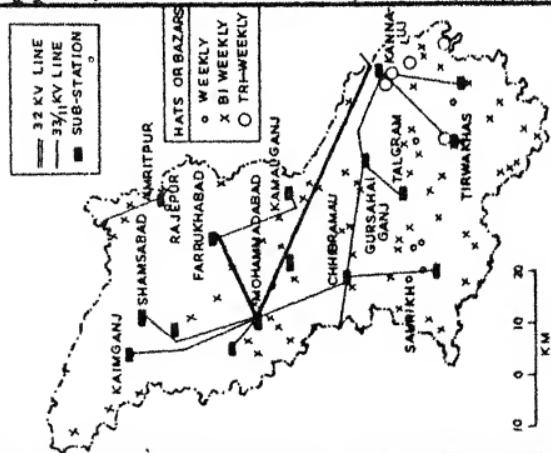
1.12. TRANSPORT AND COMMUNICATION :

Situated in the heart of the most populous state of the country, Farrukhabad is well served with a net work of transport arteries (Fig. 1.7B). Four state highways, several link roads together with railway lines connect rural and urban areas of the district with other parts of Uttar Pradesh. Upto March 1981, out of a total number of 1577 inhabited villages, 376 (23.8%) were directly connected by road, while 997 (63.2%) fell within 5 km. distance from the roads. Similarly there are 21 (1.3%) railway stations in rural areas while 420 (26.6%) villages lie within 5 km distance from the railway route. Farrukhabad and Gursahaiganj (both Urban) are two important transport junctions, well linked by roads and railways from all sides.

(a) Roads :

The roads, in the district, fall into two classes - the provincial and local. The former include parts of SH22 (G.T. road or Shershah

A FARRUKHABAD DISTRICT
ELECTRICITY & RURAL
MARKETS



B FARRUKHABAD DISTRICT
TRANSPORT-SYSTEM

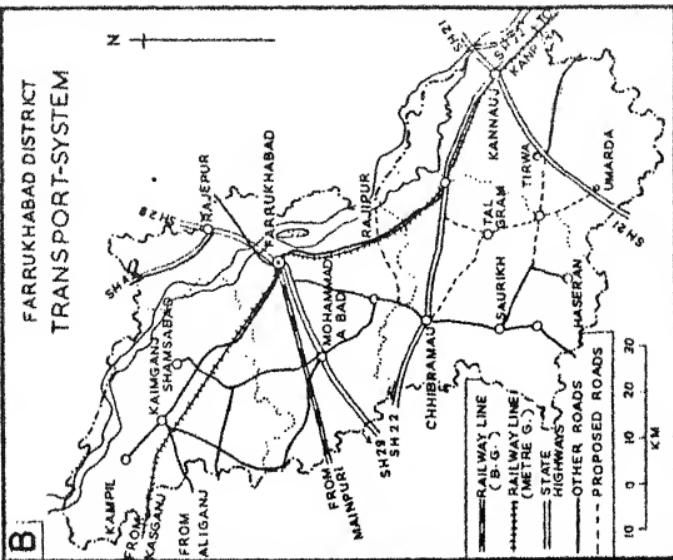


FIG. 1-7

Suri Marg) which connects Farrukhabad with Kanpur and Etah, SH29 joining it with Bareilly, Shahjahanpur and Etawah; SH43 linking with Budaun and meeting G.T. road at Gursahaiganj, and SH21 running from Auraiya to Hardoi via Kannauj (Fig. 1.7B). Among local roads, mention may be made of Farrukhabad-Kaimganj-Aliganj, Farrukhabad-Chhibrampur-Sdurikh-Bidhuna, and Shamsabad-Jahanganj roads.

The total length of roads in study area is 670 km. which consists of 183 km. of State highways, 152 km. of district roads, and other local roads. District Board due to its financial constraints and mismanagement supervises the maintenance of only 36 km. long road while 634 km. long roads are looked after by the Provincial Works Deptt. The road density is not uniform throughout the study region. On an average the district has 155 km. long roads per thousand km.² of its area. Barhpur, Kaimganj and Mohammadabad blocks, have road length of 258, 251 and 230 km. per thousand km.² of area respectively, while Jalalabad and Haseran blocks have only 60 and 19 km. A similar anomaly exists in case of road-length measured in relation to population-size. The region, on an average, has 48 km. long roads per 100,000 persons. Kaimganj

(98 km.) Mohammadabad (72 km.) blocks have the maximum road length while Haseran records the minimum length (7 km/lakh pop.). In addition to metalled roads there are hundreds of kms of unmetalled or 'kachcha' roads and cart tracks connecting villages. But these are so ill maintained that they emerge as mud pools during rainy season.

(b) Railways :

Rail traffic could not make significant break-through in the district, owing to its isolation from Calcutta-Delhi trunk route. Both metre-gauge and broad-gauge railway lines connect the district with Kanpur and Mainpuri. The metre-gauge section, with a total length of 118.4 km., runs from Kanpur to Kasganj and follows the Ganga river. Here the frequency of trains is low and time consuming. There is a need to convert it into broad-gauge to give boost(^{up}) to regional economy. The broad-gauge section is also a loop line, which has a total length of 27 km. connecting Farrukhabad with Shikohabad located at Delhi-Calcutta trunk route. It is a main source of goods movement to and from the district where passenger traffic is mainly carried through state and private bus services.

1.13. ELECTRICITY :

There is no power generating plant in the study area and electricity is obtained from Mainpuri and Panki power stations. It is distributed through 3 sub stations of 32 K.V. and 15 of 33/11 KV. capacity in the district (Fig. 1.7A). A total of 2538.8 km. long high tension lines of 33 and 11 KV, apart from 2862.15 km. of low tension line, pass through the district. Uptill now 822 villages (54.9% of total inhabited villages) have been electrified in the district. Similarly 1142 industrial power connections have been given in rural areas and 9491 private tube wells have been energised. But irregular and inadequate supply of electricity to the villages affect the farming operations and the working of industrial units including 71 cold storages (a national record) located in the district.

1.14. INDUSTRIES :

The industrial development in Farrukhabad district is hampered by the lack of mineral resources, power shortage and transport bottleneck which are the bases for industrial development in a region. Among large scale industries a co-operative sugar mill at Kaimganj is the only consolation which used sugarcane from the district and its neighbourhood.. The district has a good background for small scale and house hold industries which include processing of food

stuffs, production of food products like sweets, condiments, etc, printing of cloths and manufacturing of scent, 'bidi' and handloom cloths. Most of these industrial establishments are run without electric power. Amongst these industries mention may be made of cloth printing at Farrukhabad and scent making at Kannauj for which the district has earned wide popularity since ancient days. Due to the apathy of the British regime these industries declined but new policy of the government after independence is giving them opportunity to revive themselves. Today the country gets four to five crores of rupees in foreign exchange by the export of these products to New Zealand, Middle East, U.S.A. and European countries. Farrukhabad's printing work has also been supporting the development of handloom industry in both urban and rural areas, where atleast fifty thousand weavers are earning their livelihood. Gursahaijanj, along with Shamsabad and Tirwa, have emerged as 'bidi' manufacturing centres in the district, where 187 small units are providing sustenance to more than one thousand male, female and children workers manufacturing 'bidi'.

The huge production of potatoes (7.58 lakh tonnes in 1980-81) support 71 cold storages having a capacity of about 4 lakh tonnes per annum. But in 1978-79 the capacity fell short of the production which incurred huge loss to potato growers. A fruit preservation centre has also been set up at Pitaura (the home village of former President

of India late Dr.Zakir Husain and Khursheed Alam Khan, sitting M.P., and minister. Some small units making 'potato chips' have also been established at Chhibrampur but the permission to start this work on a large scale is awaiting government's clearance. Similarly the fate of the proposed distillery using potato wastes, near Kamalganj, is hanging in balance. The work on the proposed cotton mill at Sikandarpur (near Kampil) has already begun (Plate No.11).

There is a proposal to lay down a broad-gauge railway line from Mathura to Kanpur (through Farrukhabad) which will undoubtedly boost up industrial development of the district. This will remove the problem of the shortage of railway wagons for supplying potatoes to different parts of the country and coal to indigenous industries. With the establishment of a new industrial estate near Kannauj (first working at Farrukhabad) there are good prospects for small entrepreneurs to start new industries and improve their economic conditions.

1.15. MARKETS :

In rural areas of the region marketing facilities are provided by rural markets, hats and fairs. These rural markets, which are held weekly, bi-weekly or tri-weekly act as bridging link between the country side and the urban areas bringing consumer goods like cloths, soaps, kerosene, salt, cosmetics, etc., for the rural folk in addition to food grains which are procured from rural

areas (Plate No.4). A few of them are also cattle markets (Plate No.5) selling bullocks, cows, buffaloes, goats, etc.

Though Farrukhabad district has six big 'mandis' for exchanging local goods on large scale but except Mohammadabad all of them (Farrukhabad, Kamalganj, Chhibrampur, and Kannauj including their sub-mandis (Gursahaiganj and Tirwa) fall under urban areas. The rural areas are served by 99 markets or 'hats' of different size and periodicity. Amongst these markets only five termed as urban centres, (Galpin, 1915, Dickinson, 1932 and Smalley, 1944) are held more than twice a week, while 63 are bi-weekly and 31 weekly markets. At block level Umarda has the maximum number (18) of rural markets followed by Mohammadabad and Rajepur (10 each), Nawabganj (8), Talgram, Saurikh and Kannauj (7 each). Kaimganj block has only two markets exhibiting the highest concentration of services in Kaimganj town itself.

Most of the rural markets of the region do not have accessibility through all-weather pucca roads and lack basic facilities like sheds, halting places, drinking water and sanitation, etc. The price of the consumer items varies according to the whims of the traders who prefer barter through grains rather than cash purchase. Since markets play very important role in the socio-economic development of a region, their proper planning should attract our foremost attention for accelerating the pace of progress in rural areas.

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CHAPTER 2
POPULATION PATTERN

Population is an important aspect of rural settlement studies, because it is the people who give distinct shape, size and patterning to settlement in a region or part thereof. A low population endowed with high skill and technology may promote a planned growth of settlements in a region as in the United States, whereas a heavy population gripped with ignorance, illiteracy, poverty, disease and hunger will undoubtedly create chaotic situations leading to unplanned growth of human settlements. That is why population planning and population education are prerequisites for settlement planning. In the present chapter an attempt has been made to analyse the growth, distribution and characteristics of population in the study area before beginning the actual exercise on rural settlement analysis.

2.1. GROWTH OF POPULATION

2.1.1. Early Estimates

There is no definite evidence that when and from where the first man stepped into the region. However, evidences show that population was sparse and widely settled in favourable parts of the fertile and forested lands during the Neolithic period.

The first phase of population-growth began when

the Aryans came and settled in scattered villages, mainly along the river banks (Tiwari, 1978). Though the initial stage was marked by the large scale killing of the early settlers or their migration to remote and safe places but with the passage of time a composite culture emerged assimilating a large number of non-Aryans into the Aryan polity. This long time of the Indian history lasting upto the beginning of the Muslim invasions is marked by several phases of peace and prosperity or turmoil, disease and hunger in the region. But since no written evidences are available showing census enumeration the whole period is shrouded in mystery.

On the basis of scanty references as contained in Bana's book of 'Harsha charitam' and Kautilya's 'Arthashastra' it may be surmised that allured by its prosperity, wave after wave of immigrants entered the region during the time of Harsha, when Kannauj was the undisputed capital of the northern India. Similar records about population enumeration for military and revenue purposes have also been found in 'Ain-i-Akbari' which provides some hints regarding the Mughal period. Population during this long period remained low due to frequent warfares, famines, epidemics and natural hazards like floods etc.

2.1.2. Census period :

'Fatehgarhnama', recording the first census of the district in 1845, exhibits a total population of 696,741 which rose to 752,736 in 1847 and 924,594 in 1857, but

declined to 917,496 in 1865. The methods applied in these censuses were rough and crude. A more careful and elaborated census was taken in 1872 since then a systematic record of population of the district is available. During the British regime, due to the restoration of peace and improvement in health services, population started rising and a rapid growth was noticed after 1921 (Table 2.I) and Fig. 2.2B).

TABLE 2.I
GROWTH OF POPULATION (TOTAL / RURAL)

Census Years	Population (Total)	Decadal Growth (%)	Population (Rural)	Decadal growth (%)
1872	9,18,748	-	7,83,614	-
1881	9,07,608	-1.21	7,68,186	-1.97
1891	8,58,687	-5.39	7,20,638	-6.19
1901	9,25,812	7.81	7,99,913	11.00
1911	9,00,022	-2.78	7,84,295	-1.95
1921	8,56,633	-4.82	7,55,362	-3.69
1931	8,77,392	2.42	7,63,050	1.02
1941	9,55,573	8.18	8,30,081	8.78
1951	10,92,641	14.34	9,52,776	14.78
1961	12,95,071	18.53	11,51,990	20.91
1971	15,56,930	20.22	13,87,028	20.40
1981	19,49,137	25.19	16,34,265	17.82

Source: Census of India and District Gazetteers, Farrukhabad.

2.1.3. Decadal Growth of Rural Population :

In 1872, the year of first reliable and regular census, the rural population of the region was recorded as 783,614; Farrukhabad (263655) and Kaimganj (164,768) being the thickly and thinly populated tahsils respectively. Next census, in 1881, found a decrease of 15,428 persons (1.97%) in nine years due to the drought of 1878 and terrible fever epidemic of 1879. Kaimganj tahsil was the highest loser (10.78%) followed by Farrukhabad tahsil (4.63%). On the contrary an increase of 4.53% in Kannauj and 3.67% in Chhibrampur tahsils compensated the loss of the district's rural population (Table 2.II).

In 1891 flood, cholera and fever led to a loss of 6.19% in district's rural population. The migration of weavers and cotton printers, in search of employment to Kanpur and Bombay, was also responsible for this depopulation. Kaimganj tahsil was the highest sufferer, losing 13.96% of its rural population followed by Chhibrampur (6.37%), Farrukhabad (4.52%) and Kannauj (2.02%) tahsils.

The decade 1891-1901 recorded a net gain of 11% in district's rural population (799,913 persons). Kaimganj tahsil attained the maximum growth (18.49%) followed by Farrukhabad (11.98%), Kannauj (11.94%) and Chhibrampur (3.35%).

TABLE 2.II
DECENNIAL VARIATION OF RURAL POPULATION 1872-1981
(in percent).

Census Years	Tahsil Kaimganj	Tahsil Farrukhabad	Tahsil Chhobra-mau	Tahsil Kannauj	District Farrukhabad
1872-81	-10.78	- 4.63	3.67	4.53	- 1.97
1881-91	-13.96	- 4.52	-6.37	-2.02	- 6.19
1891-01	18.49	11.98	3.35	11.94	11.00
1901-11	2.91	- 1.00	1.68	-10.23	-1.95
1911-21	1.22	- 5.21	-2.44	-6.96	-3.69
1921-31	- 0.46	- 2.96	4.94	4.19	1.02
1931-41	12.06	1.95	11.93	12.07	8.78
1941-51	12.21	18.66	13.99	12.95	14.78
1951-61	23.64	19.96	21.40	19.21	20.91
1961-71	17.26	18.35	24.10	21.94	20.40
1971-81	13.95	18.83	18.11	19.61	17.82
Net increase					
1872-1981	95.87	89.52	137.13	119.6	108.55
Annual Rate of Growth	0.59	0.57	0.75	0.69	0.64

Source: Census of India and District Gazetteers, Farrukhabad.

(a) Growth since 1901 :

During the first two decades of the present century floods, famines, epidemics (plague, cholera and influenza) increased the mortality rate leading to a loss of 44,551 persons during 1901-21. Kannauj tahsil recorded the highest decline (16.49%) followed by Farrukhabad (6.16%) and Chhibramau (0.8%) tahsils. On the contrary Kaimganj tahsil due to better crop harvests was on gainingside (4.16%). The decade 1921-31 was marked by a slight increase (1.02%) in the district's rural population. Here again northern tahsils like Farrukhabad (-2.96%) and Kaimganj (-0.46%) were on losing side whereas Chhibramau (4.94%) and Kannauj (4.19%) compensated the loss.

Between 1931-41 region's population showed a net gain of 5.93% (46,467 persons) due to control of natural calamities (floods and droughts) and significant improvement in health facilities. The measures against epidemics were so effective that since then the district never saw any decrease in its rural population which recorded a percentage gain of 8.78, 14.78, 20.91, 20.4 and 17.82 during succeeding censuses. Infact these last forty years (1941-81) have broken all time records in population-growth due to significant improvement in health and sanitary conditions and safeguards against floods and droughts. Within the district, Chhibramau tahsil records the maximum growth and if present trend continues it will be the most populous tahsil of the region by 1991.

The present growth rate of 2% per annum must be arrested to improve living conditions of the people. A significant feature of recent population spurt is associated with phenomenal growth of urban population. Infact a new trend is being observed which exhibits large scale migration from rural areas to the neighbouring cities and towns for seeking employment. This leads to depopulation of the villages, draining of rural man power and its resources and haphazard growth of towns and cities generating slums and unhygienic conditions.

2.1.4. Net Increase :

The region's population has more than doubled during 1872 and 1981 reaching a large figure of 7.83 lakhs and an increase of 108.55% during last 109 years. Chhigramau tahsil tops the list (137.13) which accompanied with Kannauj (119.6) record higher percentage of net growth than the district average, (due to better transport and communication facilities and agricultural harvest). Kaimganj (95.87) and Farrukhabad (89.52) ravaged by river floods and accompanying epidemics together with large scale urban immigration are lagging behind.

2.1.5. Annual Rate of Increase :

The growth of population can also be analysed by studying the annual rate of increase which may be calculated

here by using the following formula : (Gibbs, 1966, p.107).

$$r = \frac{(P_2 - P_1) / t}{(P_2 + P_1) / 2} \times 100$$

where, r is the rate of increase, P_1 is the population size at the beginning, P_2 is the population size at the end, t is the time (number of years).

The calculation shows that the district has an annual rate of increase of 0.64 between 1872 and 1981. Among tahsils, Chhibrampur tops the list (0.75) followed by Kannauj (0.69), Kaimganj (0.59) and Farrukhabad (0.57). The annual growth rate during 1971-81 has been much higher (1.64) than these figures whose maximum is again recorded in Chhibrampur tahsil (2.16) followed by Kannauj (1.78) Farrukhabad (1.72) and Kaimganj (1.3).

2.1.6. Variability :

The variability index, calculated by the following formula (Geddes, 1941),

$$ye = \frac{yc - y}{y} \times 100$$

where, yc is expected population and y is the actual population.

On the basis of the percent variability mean percent variation may be calculated as follows :

$$\frac{d_1 + d_2 + d_3 + \dots}{n+1}$$

where, d_1, d_2, \dots are percent variation and n is the number,

exhibits a high percentage (33.63) owing to the fluctuating growth rates in different censuses (Fig. 2.2C). Within the district, Farrukhabad (32.07%) and Kannauj (32.22%) Tahsils have the variability indices below the regional average. Whereas, Kaimganj (36.79%) and Chhibramau (36.66) exceed the limit. The differences of 4.59 between the lowest and the highest indices clearly demonstrates an over all/balanced growth of rural population inside the study area.

2.1.7. Population Projection :

Assuming the current growth rate of rural population to continue for next two decades, the region's rural population is expected to reach the staggering figure of 19.22 lakhs by 1991 and 22.6 lakhs by 2001 AD (Table 2.III).

This needs popularisation of family planning measures as well as cautious planning of rural resources, so as to absorb ~~and~~ surplus population.

FARRUKHABAD DISTRICT
DISTRIBUTION OF RURAL POPULATION
1981

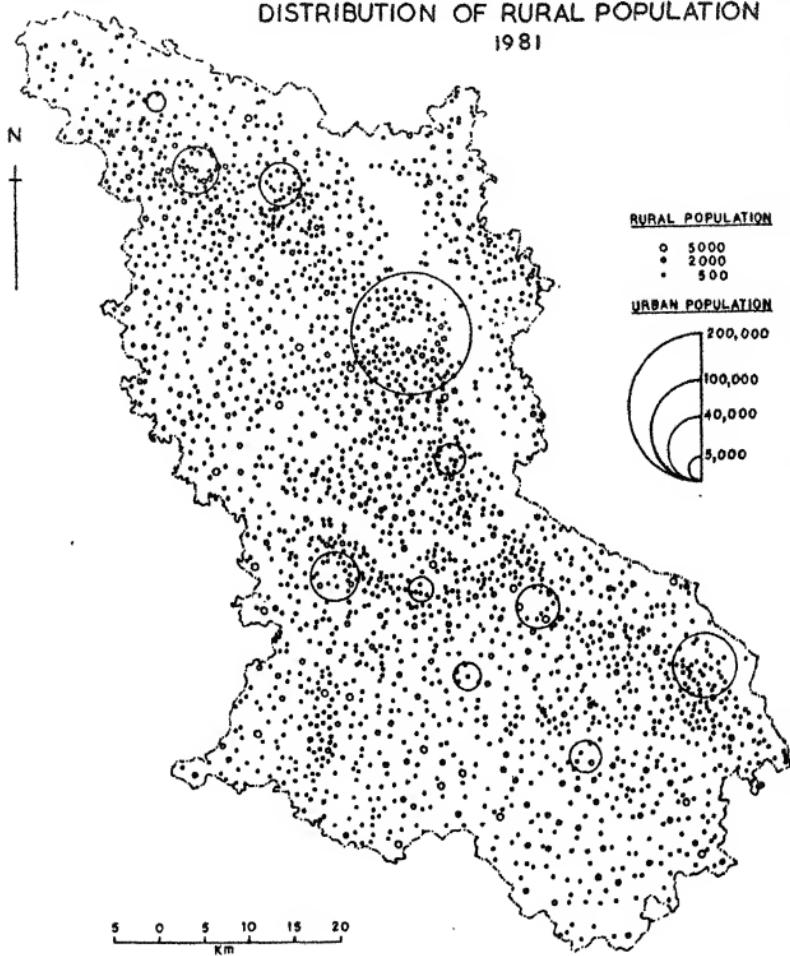


FIG. 2-1

TABLE 2.III
PROJECTED RURAL POPULATION*

Tahsils	Present Rural population (1981)	Years	
		1991	2001
Kaimganj	322,730	367,226	417,857
Farrukhabad	499,675	592,585	702,772
Chhibrampur	430,994	508,127	599,064
Kannauj	380,866	454,356	542,027
 District Farrukhabad	16,34,265	19,22,197	22,60,858

* Calculated by using following formula:

$$A = P \left(1 + \frac{r}{100}\right)^n$$

where, A stands for projected population, P is the present population, r shows the rate of growth during last decade (1971-81), and n is the number of years between A and P.

2.2. DISTRIBUTION PATTERN *

Figure 2.1 using the multiple dot method exhibits a general uniformity in the distributional pattern of rural population owing to the homogeneous nature of the terrain and physical characteristics. The Lorenz curve for rural

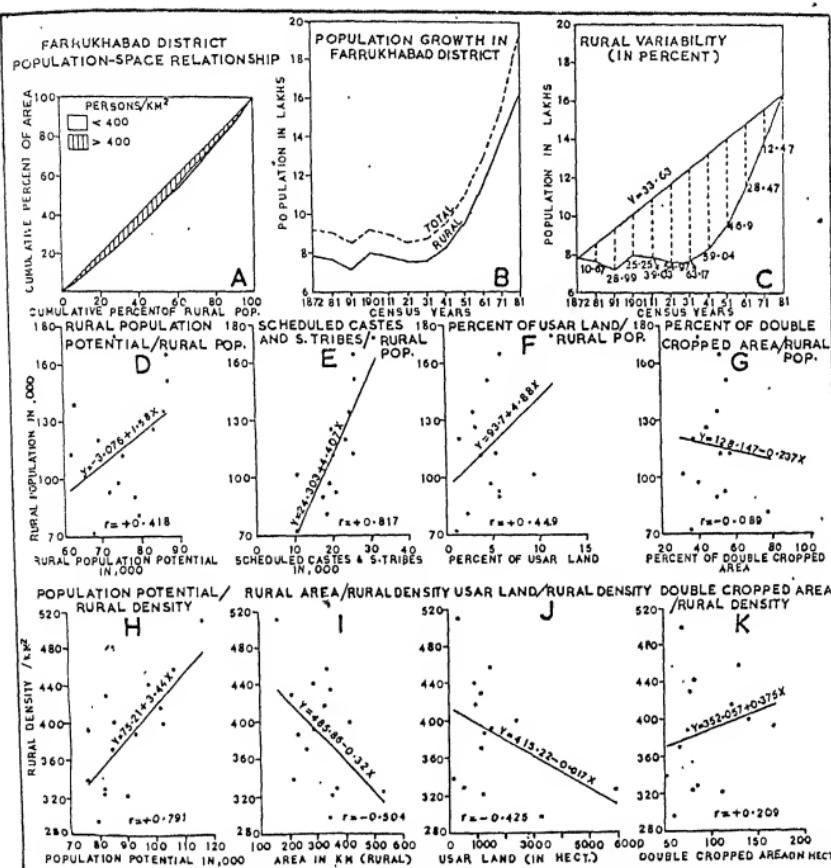
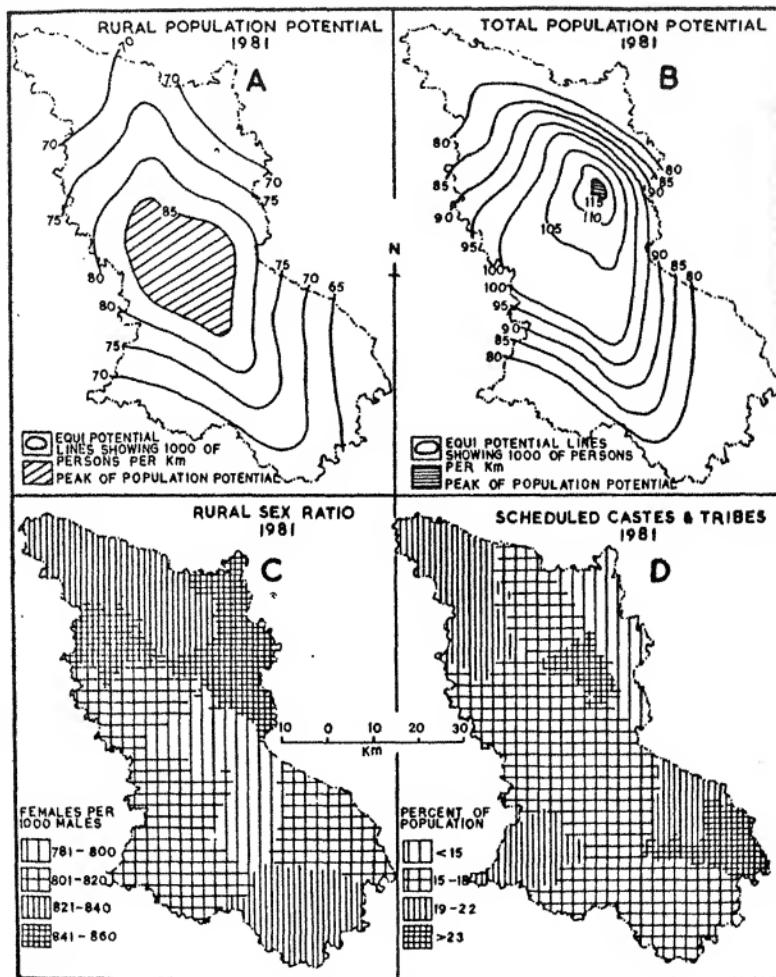


FIG. 2.2

population (Fig. 2.2A) also confirms the uniformity of distribution, as there is very little departure of the curve from the diagonal. But on closer observation slightly higher concentration of rural population is visible in blocks like Kannauj, Jalalabad, Kamalganj, Darhpur, Talgram and Chhibramau, which are better endowed with transport and communication facilities, irrigation, crop production and proximity of urban centres. On the contrary southern part of Kannauj and Chhibramau tahsils and northern part of Kaimganj and Farrukhabad tahsils owing to their greater susceptibility to floods and water logging are comparatively thinly populated.

2.2.1. Population Potential :

Another method of analysing the distribution of population has been done through the population potential (Stewart, 1947 and Smith, 1975, p. 229) model, which shows a major peak around the district headquarter (Fig. 2.3A and B). In case of total population the high population concentration may very well be marked around the twin towns of Farrukhabad-cum-Fatehgarh, which is surrounded by equi-potential lines of lower value on all sides. Here apparent pull is exerted by the transport and communication lines and urban centres. The figure showing rural population potential commands a larger area in the central part of the region under high population concen-



tration from which values of equi-potential lines go on decreasing north or southwards. Here again the impact of transport and communication lines and urban centres may be easily marked. The population potential has strong positive correlation with rural density ($r = + 0.791$), whereas rural population potential exhibits moderate positive relationship ($r = + 0.418$) with rural population (Fig. 2.2H and 2.2D).

2.2.2. Density Pattern :

(a) Arithmetic Density :

The district has a total population density of 448 persons/km² in 1981 (Fig. 2.4B); rural population density being 379 persons/km². It varies from 297 in Rajepur block to 512 in Barhpur. This variation is mainly caused by the varying nature of the soils, crop productivity, cropping intensity, transport facilities, drainage and proximity of the urban centres. The impact of such factors at local level is well marked in the figure 2.4A, which exhibits spatial pattern of rural density at nyayapanchayat level. Here density values ranges between 116 persons/km² in Sinauli nyayapanchayat to 1151 in Manjhpurwa.

(i) Low density : (≤ 200 persons/km²) :

This includes 7 nyaya-panchayats situated in north and north-western corner of the district. This

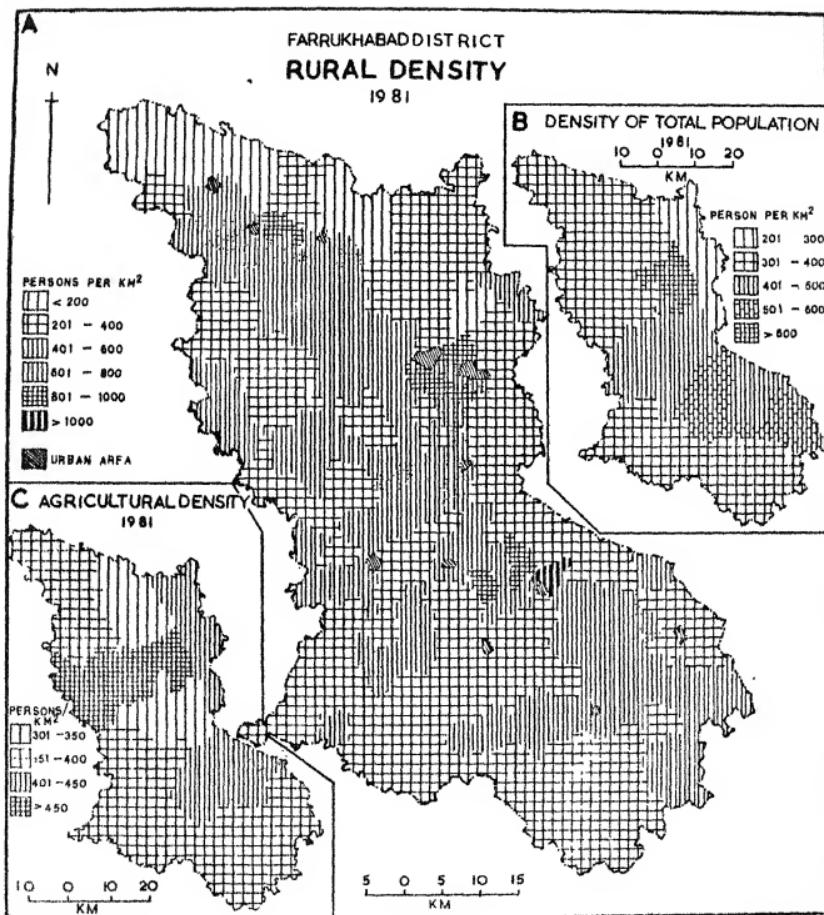


FIG 2 4

area stretches over the old bed of Ganga river which emerges as a large pool of water during rainy season. The lack of transport facilities is another retarding factor, as no road reaches (to) this area beyond Kampil and Shamsabad.

(ii) Moderate Density (201-400 persons/km²) :

This category is found in as many as 74 nyaya-panchayats. These areas are located along the left bank of the Ganga, in the waterlogged zone of the south and in usar infested part of the district.

(iii) High Density (401-600 persons/km²) :

High density is found in 67 nyaya-panchayats which are mainly located along the main communication routes or in the canal irrigated zone of the study region.

(iv) Very High Density (>600 persons/km²) :

This category stretches over 13 nyaya-panchayats of the district mainly around urban centres or old settlement sites. This area, lying in the influence zone of the urban centres, enjoys better transport and communication and service facilities. Those located along the junction of roads or railways have attained urban status acting as a link between the urban centres and the rural areas. Here the density goes above 800 persons per km². Manjhapurwa nyaya-panchayat, which records the highest density of population (1151 persons/km²) is gifted with such favourable locations. Situated along the old G.T. road with easy

linkages to Farrukhabad, Chhibrampur, Kannauj, Kamalganj, Talgram and Gursahaiganj etc. through road or railways it attracts high density of population. The area besides rich agricultural harvest supports large number of people in small and cottage industries like 'bidi' making etc.

While subjecting to statistical analysis it may be inferred that rural density has weak positive correlation ($r = +0.209$) with double cropped area (Fig. 2.2 K), but exhibits moderate negative correlation ($r = -0.504$) with rural area (Fig. 2.2 I) and usar lands ($r = -0.425$, Fig. 2.2 J). Similarly rural population depicts strong positive correlation ($r = +0.817$) with scheduled castes (Fig. 2.2 E), weak positive correlation ($r = +0.449$) with usar lands (Fig. 2.2 F) but very weak negative correlation ($r = -0.089$) with double cropped area (Fig. 2.2 G). This clearly explains that scheduled castes and scheduled tribes, forming bulk of rural labour supply, have significant role to play in the distribution of rural population. Also the acreage of usar lands is decreasing day by day with the increase in rural density due to their reclamation for building and agriculture.

(b) Agricultural Density :
Farrukhabad being rich in agricultural production

enjoys a high agricultural-density (392 persons per km^2). The density value is recorded maximum (over 500 persons/ km^2) in Mohammadabad and Barhpur blocks which are incidentally the largest producer of potato in the district (Fig. 2.4 C). On the contrary Kamalganj block observes the lowest agricultural density (305 persons/ km^2). As many as seven blocks (Kaimganj, Nawabganj, Rajepur, Saurikh, Jalalabad, Kannauj and Umarda) have medium agricultural density (Fig. 2.4 C) where the range is hardly more than 15.

2.3. RURAL OCCUPATIONAL STRUCTURE :

Of the total rural population only 28.93% is the working population whose lowest (27.13) and highest (31.36) percentages are found in Mohammadabad and Kaimganj blocks respectively. As many as seven blocks have the higher percentage of workers than the district average while the equal number of blocks belong to lower category. But in all these cases the departure from the district average hardly exceeds 2% which shows uniform distribution of working population in the region.

The working force is mainly dominated by the males, who constitute 98.04% of the total working population of the region. The percent share of males (or) females to their respective total rural population is 51.64 and 1.26 respectively; exhibiting very little variations at block-level distribution. For example the percentage of male workers to the total male population ranges between 49.33 (Mohannabad) and 56.33 (Kaimganj) while same figures for female workers are 0.28 (Rajepur) and 3.76 (Talgram) respectively.

Figure 2.5A clearly indicates that 89.23% of the workers are engaged in agriculture and allied activities : 79% as cultivators and 10.23% as agricultural labourers. At block level, the proportion of cultivators to the working population varies from 58.2% (Barhpur) to 87.38% (Haseran) while the percent share of agricultural labourers ranges from 4.94 (Haseran) to 24.32 (Barhpur, the main potato growing area). House hold industries engage only 2.19% of the working force ranging between 0.9% (Haseran) and 5.68% (Jalalabad). Other activities like transport, trade, commerce and services etc. employ 8.53% of the total working population of the region, with their minimum and maximum percentages ranging between 5.74 (Umarda) and 19.45 (Talgram) respectively.

Marginal workers, who work as part time employee or remain engaged for few months in a year, constitute only 0.19% of the total rural population of the region. It is

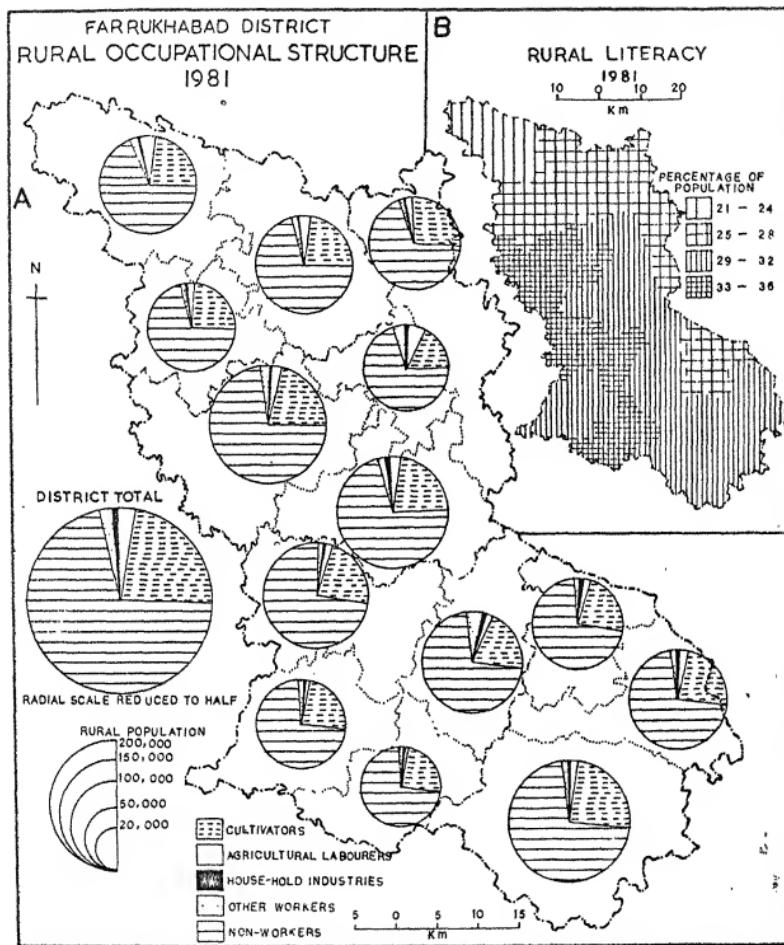


FIG. 2-5

a matter of concern that 70.87% of the rural population (Fig 2.5A) consisting of women, children and old people falls under non working category leading to high dependency ratio and poor economic development. About 0.5% of the region's population is yet to find a suitable employment to earn its living which is a matter of great concern to our government and planners.

2.4. CASTE STRUCTURE :

The rural population of the district consists of over 80 Hindu and Muslim castes which still play very significant role in controlling the socio-economic structure of the villages. Unfortunately the government has stopped practice of taking caste-wise census enumerations after 1931 onwards except in case of scheduled castes and scheduled tribes to curb casteism and communalism. But whether in case of election, development programmes or subsidies caste system is a major consideration. Hence, no socio-economic study or rural reconstruction/planning programmes would be successful unless a researcher makes a caste-wise survey of his region. On the basis of the data available in 1931 census and the surveys conducted in the sample villages Ahirs constitute the most dominant caste (11% of rural population) with their apparent strong holds near Shamsabad, Tirwa and Thatia. Employed in cattle rearing profession they have now switched over to farming and are gradually improving their economic lots at the expense of high castes

like Rajputs, Brahmins and Kayastha. Chamars (10.3%), major constituent of scheduled castes, are most numerous in Kannauj and Shamsabad blocks and supply bulk of the rural labour force. Majority of them are either land less or own very little amount of land drawing their sustenance from the work in the fields of higher castes. The distribution of scheduled castes as per 1981 census (18% of Farrukhabad's rural population) shows that these are most numerous in Barhpur (22.9% of rural population) and Kannauj (22.7%) blocks which have incidentally the largest concentration of agricultural labourers in the region (Fig. 2.3D). It is surprising that despite special concessions given to them in respect of employment and education since independence, their economic condition is deteriorating day by day. Brahmins (8.2% of the total rural population) occupying the highest social rank in rural polity are most numerous in Chhibrana and Kannauj tahsils. Besides performing religious ceremonies they are engaged in agriculture, services etc. Due to high literacy and better socio-economic status they play a pivotal role in rural politics and rural development.

Kachhis (7.4%) like Ahirs are good cultivators and are followed by Rajputs (6.6%) who are divided into a number of clans and are descendant of erstwhile rulers, zamindars and taluqdars, etc. They still retain a major part of village land and play a major role in village

affairs and politics. For agricultural activities they depend upon untouchables (Chamars, Dhanuk etc.) but innovations of new farm machines for irrigation, ploughing and harvesting, etc., have given them opportunity to lessen their dependence on human labour and make agriculture a profitable proposition.

Kisans (6.5%) and Lodhs (4.6%) are other Hindu castes found in sizeable number in the region. They are good cultivators and are making agriculture sustainable by their toil and labour.

Amongst Muslim castes mention may be made of Pathans (4.5%) of the total rural population, Sheikhs (4%) and Sayyeds (1%). Pathans, migrated from Afghanistan in 16th Century, are most numerous in Kaimganj block where they have attained considerable prosperity and economic power in view of their engagement in trade, commerce, industry and cultivation of cash crops.

2.5. RELIGIOUS COMPOSITION :

Hindus are the main religious communities constituting 88.8% of the total population of the district. They are most numerous (89.9%) in Ghribaram tahsil while Kaimganj tahsil (inhabiting large number of Muslim Pathans) record the minimum percentage (84.7).

Islam constitutes the second largest (11.09%)

religious group in the region. Its percentage share (12.4 in 1931) declined during 1946-51 when some Muslim families migrated to Pakistan but the high growth rate of population among Muslims has more or less compensated the loss during recent years. In 1931 Kaimganj (14.5%) and Kanauj (14.3%) tahsils had the largest concentration of Muslim population which still persists. Majority of Muslims belong to Sunni faith who either came from Afghanistan or were converted during Muslim regime. Shia sect. (constituting only 2% of total Muslim population) has more or less preserved its original traits. Most of them are Saiyeds (the descendants of prophet Mohammad through his Holy daughter saiyyeda) and have mostly migrated from Iran.

Christians, Sikhs, Jains and Budhists are very few in number and are only confined to urban areas of the district. Only a few Christians for missionary work are seen at Rakha (Barhpur) and some Budhist monks reside at Sankisa village (Mohammadabad).

2.6 LINGUISTIC AND SOCIO-CULTURAL CHARACTERISTICS :

According to census reports Hindi, with Kanaujia dialect, is the mother tongue of 92.5% of the people of the district. Urdu spoken by 7.47% of population is mostly confined to Muslim population. The writer during the course of the field survey has observed that Hindi contains

about 80% words of Urdu and may be better termed as Hindustani.

In rural areas of the study region very little change has taken place in the mode of living, food habits, customs of the people since olden days. People in general are God fearing, simple, generous, cooperative, fond of their children and respectful to the elderly people and the guests. They are orthodox, conservative and less receptive to new innovations. On the one hand these traits have preserved our ancient culture to servive the turmoils of history on the other these are the greatest hindrance in new economic development and modernization of the villages. Their needs are simple and their life style is hard and painstaking. In earlier days the whole village community, irrespective of caste and creed, functioned as one unit under 'jajmani' system. But the elections, consolidation of holdings, political manoeuring and government propaganda etc. have led to factional fights and caste/class consciousness amongst the villagers breaking the very fabric of village social life.

2.7. SEX STRUCTURE :

The sex ratio is in favour of males (820 females per 1000 males) owing to high mortality rates amongst females. It can be well compared with the occupational structure of the population. It is highest in northern part of the district (more than 820) which accidentally has

the highest percentage of female workers. On the contrary Barhpur block (Fig. 2.3C), in the central part of the district, records the lowest sex ratio (783 females/1000 males) owing to the preponderance of male workers who have migrated to this area to work as labourers in potato cultivation.

2.8. LITERACY :

The literacy rate of the rural population (29.65%) is slightly higher than the state average (23.06%). As in case of other parts of the country, males are more literate (40.79% of U.P. 35.18%) than their female counterpart (16.07% of U.P. 9.49%). The highest percentage of literacy is found in Chhikramau block (males 48.16%, females 20.39% and total 35.5%), while Kaimganj block located on the extreme north-western corner occupies the lowest place (males 29.68%, females 9.6% and total 20.7%). Figure 2.5B clearly exhibits that higher percentage of literacy is found in the southern, central and south-eastern corner of the district which enjoy better educational facilities. On the contrary northern part of the district and a narrow tract along the left bank of the Ganga river due to their inaccessibility and large concentration of Muslim population (who still practise strict purdah system in females), record low percentage of literacy.

2.9. MIGRATION :

Though statistics for the migration of population are not available but on the basis of field studies, conducted in the sample villages, it may be surmised that both internal as well as external migrations are going on in the region. Besides the in or outward migration of females due to their marriage, large number of people move to neighbouring cities/towns like Kanpur, Farrukhabad, Kaimganj, Chhibranau etc. to earn their livings and to acquire better educational training and expertise. Unable to earn their living in rural areas by practising age-old family business some artisans have even migrated to far off places like Jaipur and Srinagar, etc., to work in handloom or cloth-printing industries. During last two/ or three decades it has been observed that towns and urban areas are attracting people from surrounding villages on whose cost these are observing mushroom growth. Unless we improve the hygienic conditions of the villages and make them economically viable this brain drain and plunder of rural resources will go uninterrupted cutting the very root of village prosperity and development.

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CHAPTER - 3EVOLUTION OF RURAL SETTLEMENTS

Farrukhabad district, owing to its location along the right bank of the Ganga, which has played a major role in the rise and fall of the Indian civilization, has always attracted the settlers, empire builders and invaders since time immemorial. Numerous old sites have been discovered throughout the region of which mention may be made of Kannauj (ancient name Kanyakubja), the capital of king Darupad (Mahabharat Times), Harsha (during 7th century) and Jaichand (during 12th century). Kampil (Mampilya) and Sankisa-Basantpur (Sankisa) - two Buddhist towns, and Farrukhabad, the seat of Bangash Nawab during Muslim period. The wealth, prosperity and accessibility of the region have always attracted horde of settlers and invaders who have played a definite role in the settlement history of the region. The main objective of this chapter is to reconstruct this cultural landscape of the area by throwing light on the settlement's history of the region and colonization processes.

3.1. SOURCES OF INFORMATION :

Various sources like (i) written records, (ii) archaeological evidences, (iii) toponomy, (iv) land-tenure and tenancy system, (v) social-customs, and (vi) folk lores etc. may be tapped to explain the evolutionary phases of settlements in the region.

3.1.1. WRITTEN RECORDS :

Prior to the advent of Muslims, the entire ancient history of India is shrouded in mystery, lacking scientific temperament of analysing the historical facts and events. Hence, there is always dearth of such written records which could throw light on the evolution of settlements and colonization process. Whatever information may be gathered in this sphere is based on secondary sources like (i) religious scriptures (Puranas, Epics etc.) (ii) Buddhist and Jain literature, (iii) travel reports of foreign travellers like Megasthenes, Fa-Hien, Hiuen Tsiang, ITsing and AlBeruni etc., (iv) biographical books ("Harsh-Charitam" by Banbhatta), and (v) a number of books on history ("Arthashastra" by Kautilya, and "Ancient Geography of India" by Cunningham 1871 etc.). These books mention a number of old settlement sites like Kangakubja (Kannauj), Kampilya (Kampil) and Sankisa (Sankisa Basantpur) etc., besides throwing some light on the socio-economic conditions of the people residing therein. Similarly detailed account of the administrative and revenue division, alongwith the general conditions of the people during the medieval period may be had from "Ain-e-Akbari", "Baburnama" and Muslim chronicles. During the British period systematic records in the form of district gazetteers, census handbooks, settlement reports, topographical sheets and Cadastral map, etc., were prepared which are well preserved in State archive, revenue record

rooms and libraries and may throw sufficient light on settlement pattern during 19th and 20th centuries.

3.12. ARCHEOLOGICAL EVIDENCES :

The district of Farrukhabad preserves many old sites whose archeological excavation may yield fruitful results towards discerning the ancient settlement patterns in the region. Unfortunately no systematic attempt has yet been made in this direction. A few years back an excavation attempt to digout Kannauj 'Khera' (Plates 8,9 and 10) was made under the instructions from the U.P. Government but the work could not yield substantial evidences, owing to the paucity of funds and lack of enthusiasm from the government side. As large scale excavation of existing 'Kheras' (mounds) is yet to be taken up, we have no alternative except to be contented with a few coins, potteries or old sculptures (Plate 13) laid bare during the rainy season by the erosion of the upper surface layer. The problem becomes still complicated when people do not extend their valuable co-operation and try to conceal the little bit of information and evidences which they have. Many Saiyed families of Muslims maintain "Shajra" (family tree) of their family history which is also not made public for fear of being lost.

3.13. PLACE NAMES :

Place name analysis has assumed considerable

significance in modern settlement studies for it throws ample light on the time of settlement, colonization system, ethnic background of the settlers and also the "physical character of the place of settlement" (Singh, 1977, p.38). It has been observed during the course of field work that place names in the region (as in case of other parts of the country) have been more or less preserved with of course some distortion in the pronunciation etc. with the course of time. For example Aryans used Sanskritised names for the villages founded by them while during Muslim period these were named using Arabic/Persian and Urdu words. Similarly settlements founded during Rajput period may be easily differentiated from those belonging to pre-Rajput period. On the basis of these evidences following study of the place names of the villages of Farrukhabad district has been attempted (Fig. 3.1).

(a) Place Names Associated with Forests :

The travel descriptions of the early travellers like Hiuen Tsiang and the epics show numerous references of the thick cover of forests occupying the region during ancient days. The Aryans and later settlers cleared this vast forested tracts by burning and cutting of trees which is well testified by the place names of villages like Bankati, Bangawan, Phulwari, Kataiya, Baghat-e-Garotop, Chandani, Banseli, Bansmai, Amrauli, Piprauli, and Bansaramau etc. Some of these names suggest the procedure of forest

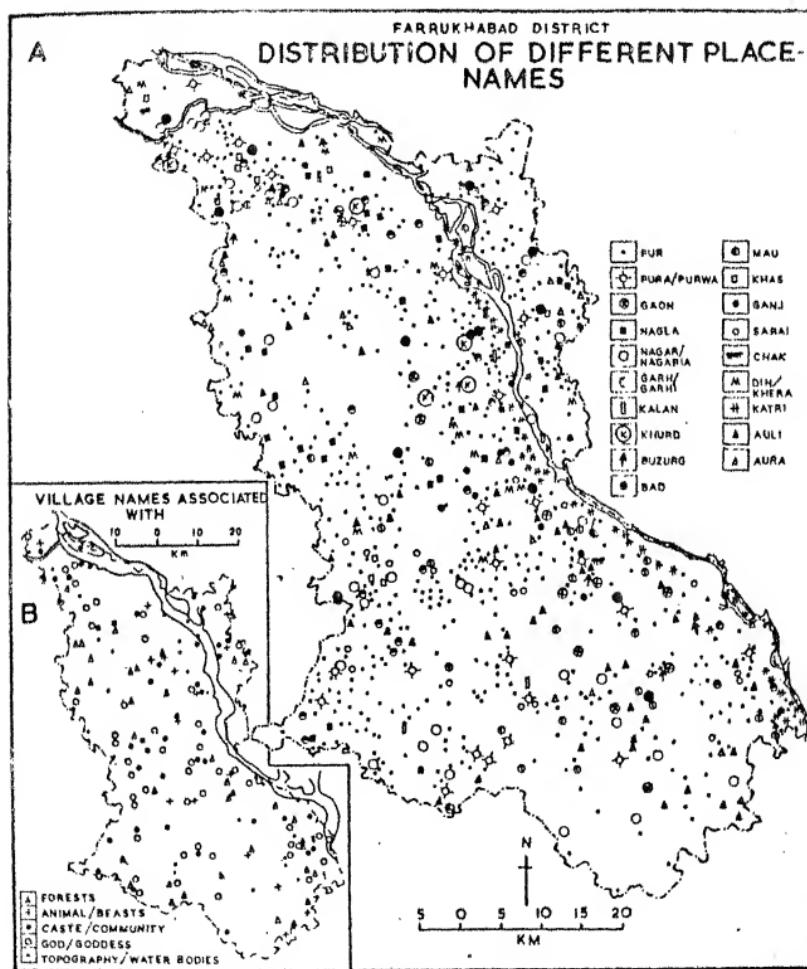


FIG. 3-I

clearance while others indicate the preponderance of a particular variety of tree found in the jungle (Fig. 3.1B).

(b) Place Names associated with Animals :

Another group of village names may be associated with the names of the animals living in these forests like Baghau, Bandar Kherha, Bhainsar, Burhiya Bherha, Hathipur, Hathin, Singhpur, Papihapur, and Chiriya muhuliya etc. (Fig. 3.1B). These names very well indicate that such wild animals were abounding in these forests during ancient days.

(c) Place Names associated with Topography :

There are village names which indicate towards the topographical conditions. Villages situated on high grounds are named as Paharpur, Uncha, paharha, while those associated with well, pond or rivers are called Kunwan KherhaKhas, Kuiyan Kherha, Kuiyan Sant, Talgram, Dariyapur Patti etc. (Fig. 3.1B). A number of villages lying in the low land area along the Ganga show suffix or prefix like 'Katri' or 'Kachhoha, etc. i.e. Katri Qayampur, Katri Kutra, Gugrapur Kachhoha, Chandapur Kachhoha etc. Other villages like Husainpur Tarai, Harsinghpur Tarai and Karampurghat etc. may also be included in this category.

(d) Place Names associated with Genetics and Authority:

Though there has been a lot of transformation in

the names of the villages since olden times, many of them still retain some of their original traits in one form or other. For example village names like Bhatasa, Bharatupur, Changamai, Dunde mai, Sarda mai, Jasu mai, Mahoi, Nisai and Mawai, etc. denote the impact of Dravidian culture and generally owe their origin to pre-Aryan times. Similarly Aryans and later Rajput settlers added Sanskrit words like 'Pur', 'Purwa', 'Nagar', 'Gaon', 'Gawan', 'Ghar' or 'Garhi' as suffix or prefix with village names. Villages showing Arabic or Persian words like 'Kohna', 'Jadeed', 'Kalan', 'Khurd', 'Buzurd', 'Veeran', 'Abad', 'Doyam', 'Khas', 'Mashriq', 'Maghrib', etc. indicate the impact of Muslim culture. A large number of villages show Muslim names with suffix of 'Pur', e.g. Allahdadpur, Kaimpur, Ghazipur etc. These are generally older settlements whose names have been changed during Muslim period. The suffix 'ganj' has been used for market places, e.g., Kaimganj, Gursahaiganj, Karimganj, Yagootganj and Miyaganj etc. The villages having suffix of 'Sarai' (Sarai Miran, Sarai Sunder, Sarai Daulat, etc.) show the halting places along the roads and routes during Muslim period. Some local chiefs who built forts added suffixes like 'garh' or 'garhi' to village names, e.g., Rajagarhi, Bishungarh, etc.

The villages using suffix of 'kherha' (mound) indicate old sites which were later on destroyed by Aryans or Rajput settlers. Similarly the 'Nagla' denotes hamlet emerging out of the old village.

(e) Place Names related with Communities and Castes:

As in other parts of India, a number of the villages of the study area have been named after the dominating caste and community residing therein. Examples are Nekpur Kayasth, Nekpur Khatri, Rashidabad Khatri, Rashidabad Brahmanan, Surajpur Brahmanan, Surajpur Chamrauwa, and Imadpur Pamaran, etc. In case of large villages hamlets are invariably named after the caste residing therein. Other villages like Bharthari, Bharepur, and Bhareuli etc. are associated with the Bhar tribe which was occupying this area prior to the advent of the Rajputs.

On the contrary, except Turkpur, no other village has been named after Muslim castes. But many villages are deriving their names after Muslim prophets, e.g., Nagla Adam, Musepur, Ibrahimpur Bangar, Ismailpur, Ayyubpur, Yousufpur, Sulemanpur, Khizirpur, Isapur and Mohammadpur, etc. (Fig. 3.1B). There are many villages named after all the four Caliphs of Islam, i.e., Bakrabad, Umarpur, Usmanpur and Aliapur. The same criterion has been followed in the naming of several villages after Hindu deities, i.e., Bhagwanpur, Rampur, Shankarpur, Harharpur, Mahadeva Khas, Devipur, Durgapur, Lakhapur, Gangaganj, Sadar Dwarikapur, etc. (Fig. 3.1B).

Some villages have also been named after (i) their ruler like Akbarabad, Jahangirpur, Shahjahanpur, Khurrampur,

Lodipur, Mohammadabad, Sarai Shah Mohammad, Shamsabad and Darapur, etc; (ii) Clan chiefs as Makanpur, Kishanpur, Chandpur; or (iii) their relatives like Kaimganj, Kamalganj, Roshanabad; and also after 'rishis' and 'munis' like Kampil and Singh Rampur etc.

(f) Place Names Associated with Grants :

Sometimes rulers have granted village lands as donation or charity to their soldiers or priests which invariably use epithets like 'milk', 'arazi', 'jageer', 'patti', etc., e.g. Milk Santokh, Milk Sultan, Milk Saifullah, Arazi Chanda, Arazi Padri Saheb, Mahmoodpur jageer, Kunwarpur imlak, Iqbalpatti and Muzaffarpatti etc. Similarly village names using suffix like 'Mafi' or 'Maafi' indicate the exemption of revenue, e.g. Punthar deha mafi, Shakarpur dehamafi, Sarwarpur Zbt mafi, etc.

Many village names in the district seem to have been associated with languages and tribes belonging to far off places. The origin of suffix like auli, vali, oli etc. is similar to the Marathi word 'vali' (Kosambi, 1975, p.42), while 'aura' 'auri' are chola terms (Baden Powell, 1896, p.74). Similarly suffixes like 'area' 'ari', 'liya' and 'iya' etc. belong to different language groups (Fig. 3.1A). During the present century a few English words are also finding place along with the village names

region. The assessment of the land revenue was fixed as one-third of the average yield, and it was collected in cash in place of the crop produce. The cultivated land was correctly measured and was classified on the basis of its soil types as, (i) 'pooly' (annually cultivated), (ii) 'perouli' or 'parti' (left fallow for short periods), (iii) 'Chachar' (fallow for three or four years), (iv) 'banjar' (waste land).

The main owner of the land were Rajputs, Brahmins and Muslims. The successors of Akbar granted 'Jageers' to some of their loyal courtiers and officers who were called 'jageerdars' (Joshi 1968, pp. 202-209).

During British period, the right of land ownership vested in 'zamindars' who collected rents from peasants and cultivators even by applying harsh methods of manual torture. The district of Farrukhabad, consisting of 1819 villages, comprised of 3563 'mahals' out of which 2432 were 'zamindari', 642 'pattidari' and 489 'bhaiyachara' (Neave 1911, p.79).

After a long period of suffering under 'zamindari' system tenants were provided heritable rights (but not transferable (through U.P. Tenancy Act of 1939). But the true relief came in post independence days with the introduction of U.P. Zamindari Abolition and Land Reforms Act, 1950 (U.P. Act No.1 of 1951). The tillers were made actual owners of their land with transferable rights.

Since then several acts have been made by the government for the reform of land tenure system and for the welfare of poor farmers. Amongst these mention may be made of the U.P. Consolidation of Holdings Act 1953, U.P. Large Land Holdings Act 1957 and U.P. Imposition of Ceilings on Land Holdings Act 1960 etc. Though these endeavours have been successful in providing security to the farmers but these have not yet achieved the cherished goal of restoring the tiller's right over the land owing to socio-economic constraints and complex law of inheritance. Some of these land reforms like consolidation of land holdings have encouraged new dispersal tendencies as a result of which individual farmers have built farm-steeds housing cattle-shed, pumping-set, farm-machineries, etc.

3.15. HISTORICAL CULTURE AREAS AND COLONIZATION SYSTEM :

Gifted with fertile soils, moderate climate, rich forest produce and plenty of natural water, the region attracted primitive settlers since early days. These primitive people called Proto-Indics or Proto-Australoids came during Neolithic period yielding place to Nishadas, Savaras, Dasas, Dasyus and Bhars etc. (Jain, 1964, p.6 and 1970 pp.143-144). They were subjugated by the Dravidians who possessed higher degree of civilization and introduced city culture in the region. Aryans (2500-2000 B.C.), belonging to the Nordic family, entered this

region from the plains of Punjab and drove out Dravidians and original settlers. Many of them were converted into slaves and servants and were accorded the lowest place in the Aryan social hierarchy. Situated along the right bank of the Ganga river, which played significant role as a water way in colonizing non-Aryan areas of the east, the district occupied a prominent place during the Aryan period when 'Kanyakubja' was the capital of the 'Panchals'. Since then onward up to the days of Harsha and the Bangash Nawabs Farrukhabad district made a significant contribution in the cultural and political history of the northern India.

3.2. EVOLUTION OF SETTLEMENTS AND SEQUENT OCCUPANCE :

Above discussion gives us sufficient insight to the entire history of the evolution of settlements in the region into three distinct phases of the Indian history :

(i) ancient, (ii) medieval, and (iii) modern.

3.21. ANCIENT PERIOD :

(a) Pre-Aryan Period :

It is a matter of debate that when and how the first human settler migrated to the study region. However the discovery of the cave sites in Mirzapur district and human skeletons in Pratapgarh district, besides the antiquity of Kannauj, leave no doubt that Mesolithic hunters migrated to this region from the Vindhyan area between 10000-7000 B.C.

and built their temporary huts near the water bodies. They were succeeded by Proto-Australoids who introduced "the cultivation of rice, the manufacture of sugar from the cane, weaving of cotton cloths, and the use of betelvine etc." (Majumdar, 1977, p.17). They are credited with introducing "the entire system of early agrarian distribution and rural settlements" (Singh, 1975 p.355) in the region. They were followed by the Dravidians who were well familiar with the architecture, art of navigation, trade, use of coins and the cultivation of wheat, etc. (Singh, 1975, p.355) and introducing city-culture in the region. They had ruling chiefs living in strong fortresses and enjoying considerable power and pelf. Rigveda mentions such pre-Aryan settlers as Dasyu or Asuras residing in well built towns and forts (Mookerjee, 1950 pp. 9-12), a number of which were destroyed by the Aryans during their colonization. Though these pre-Aryan settlers were annihilated by Aryan clans their off springs continued to live in remote forests or were admitted as shudras (untouchables or service castes) in the Aryan society. In due course of time their free-mixing gave birth to the composite culture of the country.

(b) Aryan Period :

It was around 2000 B.C. when Aryans, after settling first in Punjab, migrated towards east.

According to Mahabharat the territory between the Ganga and the Yamuna was governed by a powerful Aryan tribe

known as "Bharatas" (Mahajan, 1978, p.118). Conquering the non Aryan tribes and destroying the city culture of the Dravidians, they established a large number of villages along the Ganga and its tributaries (Fig.3.2 B). According to Havel, these villages were originally the military camps which were later on converted into permanent settlements. Along the river banks some centres of religious and moral teaching (ashrams) like Singhi Rampur and Saurikhi, were built by Aryan rishis to propagate Aryan culture.

The Aryans preferred hamlet type of settlements with dwellings consisting of thatched wood cottages, Rigveda describes their construction as follows :-

"Columns are set up on firm grounds with supporting beams leaving obliquely against them and connected by rafters, on which long bamboo rods are laid, forming the high roof. Between the corner posts other beams were set up according to the size of the house. The crevices in the walls were filled in with straw and reed tied in bundles and the whole was to some extent covered with some material. The various parts were fastened together with bars, pegs ropes and tongs". (Mahajan, 1978, p.88).

Prior to the 4th century B.C. the Aryanisation of the region was completed and a four-tier political organisation consisting of tribal Kingdom (rastra), tribes (jana), tribal unit (vish) and village (gram) evolved in the region

(Thapar, 1967 p.37). 'Griha' (house), the smallest unit of the settlement, followed by 'Kula' (the habitation of joint family) was headed by the oldest member of the family. The fundamental unit of the administration was the village (Dube, 1955, p.2) which were generally of three types : i) majority of them having mixed population of Aryans and non Aryans were based on agriculture. The habitat (vastu), centered round the main deity of the village, was encircled by cultivated fields (gram kshetra) outside which lay forests and pasture grounds (Vraja), ii) Border villages (Paccanta grama) were inhabited by aboriginal or degraded tribes, while iii) industrial and professional villages were mainly inhabited by artisans and craftsmen (Bose, 1961, pp.35-36).

On the basis of size, Acharya (1933) classified Aryan villages into six categories: 1) 'goshala' (cattle ranch), ii) 'palli' (a small barbarian settlement), iii) 'grama' (village). All these were included under rural area while remaining three were urban in nature which included viz. iv) 'durga' (fort), v) 'Kharwata' or 'pattan' (town) and vi) 'nagar' (city). Similarly according to their plan and layout the Aryan villages may be classified under eight types, viz., i) 'dandaka' (resembling a staff), ii) 'sarbato-bhadra' (happy in all respects), iii) 'nandayavarta' (abode of happiness), iv) 'padmaka' (like lotus flower), v) 'svastik' (like mystical figure so named), vi) 'prastara' (conch-

shaped), vii) 'karmuka' (bow shaped), and viii) 'Chaturmukha' (having four faces or wall). The villages had a quadrangular plan and were generally encircled by a wall and moat for defence purposes. A temple, tank or a public pavilion, often occupied the centre of the village. A well laid pattern of streets, drainage system, and residential blocks segregated by communal apartments, were distinct features of the village anatomy. The two neighbouring villages were joined by cultivated fields and pasture lands, lying between them (Acharya, 1933).

(c) Buddhist Period :

A distinguish change in the system of colonization administration and pattern of settlement was marked in the region with the rise of the Buddhism around 500 BC. Prior to the beginning of the Buddhist period the study area formed part of the Panchala state, which was one of the leading 16 janapadas of the country. Kampilya, then a glorious city along the bank of the Ganga, got the distinction of being the capital town of this powerful kingdom (Fig. 3.2B). The remains of the fort of king Drupad and the place of historic 'swayamber' of Draupadi and Arjun, have still their existence in the north-western part of the district (Plate 7). Kanyakubja, also on Ganga bank, was another important city in southern part of the study area. Later on the state was conquered by Ajat Satru

and was included in the Magadh Kingdom. Thence onward before reaching the hands of Chandragupta Maurya, it was ruled by Nandas for about 100 years (Mahajan, 1978, p.217). During Mauryan empire roads were built for the trade development, of which mention may be made of the famous Grand Trunk road, which was initially cleared by 'Asoka the Great.'

In order to have easy control over the majority of the population preferred to live in villages which according to their size were known as 'Gamak' (small village); 'Gama' (ordinary village) 'Nigama' 'gama' (big village), 'Dwara gama' (sub urban village) and 'Pachhanta gama' (urban village), each consisting of cluster of houses. Except surrounded by boundary walls or fencing to guard the fields from birds and beasts (Mahajan, 1978, p.201), and to save them from enemies too, the village setting in that period was same as now (Majumdar, 1977, p.150). The houses were clustered together, surrounded by 'Gramkshetra' or agricultural fields. The fields were the property of an individual or a family, but some part of the soil produce, varying from one-sixth to one twelfth, was fixed as the share of the king (Mahajan 1978,p.201), 'Vana' (the pasture land in surroundings of the village) was the common property of all 'Gopalakas' or the herdsmen. The persons having no land worked in the fields as the labourers. Out of the cultivating fields, the thick forests were used for the purpose of hunting and collecting fire wood by the villagers. The village was almost a self sufficient unit and the people were in

general prosperous. Apart from the agriculture, setting up of a number of house-hold industries like manufacturing of bows and arrows, wood work, stone work, leather work, pottery, ivory, weaving, basket making, garland making and butchery etc. were the main sources of livelihood for the village folk.

The village administration was looked after by the village headman, known as 'gramika', who was either an elected member or sometimes nominated by the king. He took help from the 'gram vriddhas' (the elder members of the village) for the smooth running of village affairs. Above five or ten 'gramikas' the headman was known as 'gopa', who himself was under control of 'sahanika', the head of one quarter of 'janpada' or the district.

(d) Post-Buddhist Period :

By killing the last Mauryan king, around 185 B.C., Pushyamitra established the 'Sunga' empire in the region. Thence onward Kushans and several others made their small appearances on the throne and the whole of the north India saw a political uncertainty during early centuries of the Christian era. The political stability came with the rule of the Guptas in 320 A.D., when people were again seen happy with the return of peace and prosperity in the region. During that period, the Chinese traveller Fahien, who stayed in India for six years visited the region described

as follows "...the country is very productive, the people are very prosperous, and exceedingly rich beyond comparison" (Neave 1911, p.119).

The head of the village was still known as 'gramika,' who has a company of his subordinate administrators, known as 'dutas' (messengers), 'simakarmakaras' (boundary makers), herdsmen, kartriy 'lekhaka' (scribes), 'dandika' (Chastiser), 'chdurrrodharenika' and 'satabhatas'. A group of villages was called 'pethaka' and 'sankata', while smaller units or divisions of a village were called 'agrahara' and 'patta' (Mahajan, 1978, p.445).

During the period of political disturbances, the neglected capital town of Kampilya lost its glory while Kanyakubja remained popular to its religious importance. "Fahien found a thousand monks and nuns belonging to Hinayan and Mahayanism there, while followers of Hinayanism were found in monasteries at Kanyakubja" (Mahajan, 1978, p.451). Another important centre of Buddhist religion developed at Sankisi (Sankisa) on the western border of Farrukhabad district, "...These cities have wells, tanks, temples with halls, storage of drinking water, parks, lakes, causeways etc. In villages the farmers grew rice, wheat, ginger, mustard, melons tamarind, plantain, pears, peaches, etc." (Mahajan, 1978, p.466).

With the fall of the Gupta empire by the middle of the 6th century the region fell under the control of the Mukharis leader, Harivarman. In 554 A.D. Isanavarman took the title of 'Maharajadhiraj' of Kannauj. Then the region saw the attack and murderous assault of the Huns as a result of which the Buddhist culture suffered a serious blow and a number of their monasteries and religious centres at Kannauj and Sankisa were raised to ground. After the killing of Grahavarman, in 606 A.D., by Devagupta, the study region passed on to the hands of Harshvardhan.

Harsh was a powerful monarch who selected Kanyakubja (Kannauj) the capital of his large kingdom. He spared no efforts to raise it to the status of one of the most important city in Northern India. It was decorated with beautiful gardens, tanks of clear water and museum of rarities collected from distant lands. The travel account of Hiuen Tsiang, Chinese pilgrim visiting India during 630-644 AD, and "Harsh Charitam", written by a Brahman poet of Harsh's court named Bana, present a complete account of his rule and economic prosperity. It was so prosperous and well managed that it may be called the golden period of the study area. The Kingdom was divided into provinces, divisions (bhuktis), districts (vishayas) and villages (pathakas). The villages had the inner gates and the walls were wide and high, the streets and lanes were tortuous

and winding. The houses were surrounded by low walls, made of lime or mud mixed with cow dung.

The village administration was carried through 'gramakshapatatalika', the headman of the village, with the help of his associates, known as 'Karanikas'. The government had full co-operation of the local bodies and most of the work was left to their hands. The king was so interested in solving the rural problems that sometimes he personally visited remote areas. This prosperity with high standard of living of the people was mainly based on agriculture leading to the large scale production of fruits, vegetables and grains etc. The construction of canals and dams ensured irrigation during dry season. The feudatory system bestowed full property rights to the holders of the land. The king also had his possession over vast agricultural land which was cultivated by tenants paying one sixth of the total produce to the government. The king used to take much interest in agricultural and trade development. For smooth flow of traffic and trade a number of 'Rajya Margas' (State highways) were built which were decorated with shady trees and rest houses for men and cattle. In order to encourage local industries special grants were given to oilmen, silk weavers, leather workers and carpenters, etc. who resided in separate localities or built separate hamlets near the main village. This led to the vigorous growth of new settlements.

3.22. MEDIEVAL PERIOD :(a) Rajput Period :

After the death of Harsh, in 648 A.D., anarchy prevailed till 815 A.D., when the kingdom was conquered by Nagbhat II, the Gurjar leader. The dynastic rule lasted till 1018 A.D. when Kannauj was led in shambles by Mahmud of Ghazni. During the seventy year, a number of petty kingdoms, mostly governed by aborigines chiefs of Meo and Bhar tribes, emerged in remote and inaccessible areas of the region and complete anarchy prevailed throughout the study area till the formation of new Gaharwar dynasty (in 1090 A.D.) under the leadership of Chandradev. During this time peace and prosperity returned to the region and Kannauj rose to the peak of its glory so as to attract Shahabuddin Ghori, who defeated it's last ruler Jaichand (Plates 8, 9 and 10), in 1193 A.D. Jaichand was the last Hindu King of the region who not only subjugated petty local chiefs but invited many Rajput families from outside to settle in the region. These Rajput settlers drove away aboriginal tribes (Meos and Bhars) and established new colonies all over the region, of which mention may be made of Kusumkhor, Udarnau, Rampur, Bhojpur, Jijhota, Kanjhiana, Dundiya-Kherha, Daheliya, Kureli, Maudha, Kilmapur and Khimsepur etc. (Fig. 3.2A).

A special feature of Rajput colonization is related to their complete disregard for tribal culture. That is



FIG. 3 2

why aboriginal settlements were either raised to ground or abandoned (Fig. 3.3B) and new colonies emerged in their vicinity (the old aboriginal settlements now forming 'kherha' or mound). They made their own "Chandrabedi" tanks and houses against the "Suryabedi" plan of aborigines (Crook, 1896, p.4). Villages were largely grouped around a fortress or clan chief's house and their outer boundaries were arbitrarily marked by the patches of the forests and woodlands, 'usars' and waste lands (Singh, 1965, p.46). The central villages later on formed basis for Muslim territorial divisions like "mahals", "parganas", 'tappas', or 'turfs', etc." (Tiwari, 1982, p. 39).

(b) Muslim Period :

With the fall of Kannauj, the region came under Muslim rule and many Rajput chiefs became vassals of the Delhi Sultans. Shamsuddin (1211-36 AD) attacked Rathors of Khor and built Shamsabad on the ruins of Khor. Thence onward complete anarchy prevailed on the region and many Rajputs revolted against the Muslim rule. In order to crush these rebellions many times Delhi Sultans, in person, intervened and the whole region was laid waste to terrify local people. Consequently a number of villages were depopulated leading to declining phase of rural settlements. This period of turmoil and insecurity continued till Shershah became emperor of Delhi after defeating Mughal emperor, Humayun. Thence onward under the Afghans

A

FARRUKHABAD DISTRICT
MEDIEVAL TERRITORIAL DIVISIONS

(DURING AKBAR'S PERIOD (A.D.1556-1605)
(BASED ON AIN-I-AKBARI)

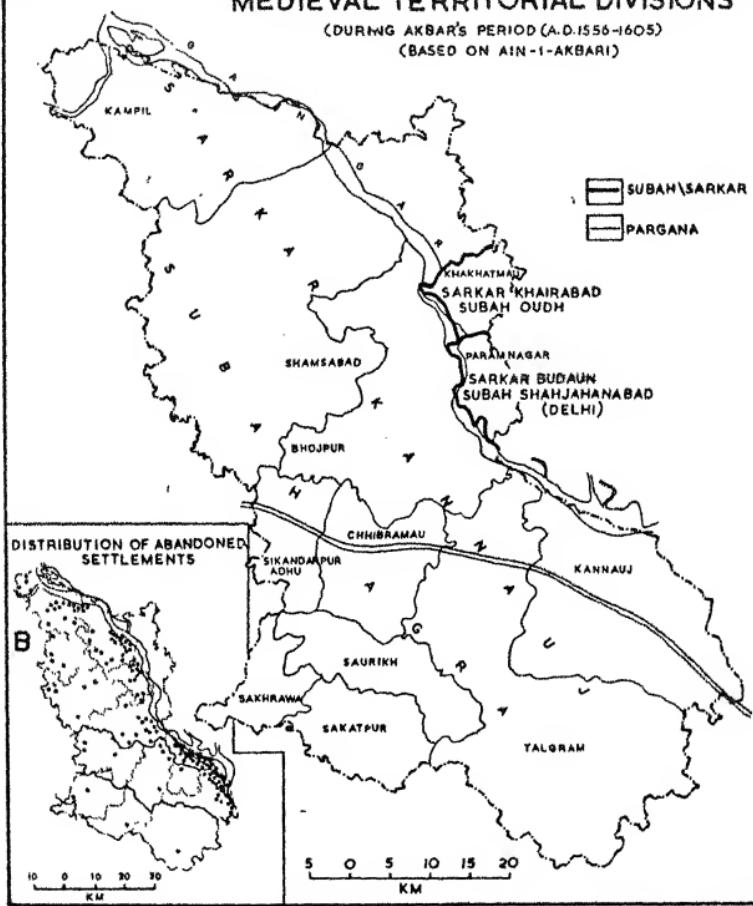


FIG. 3-3

and Mughals peace continued in the region.

Shershah constructed the famous Grand Trunk Road passing through the region, and many 'sarais' and 'hats' (like Bhawani sarai, Sarai Prayag, Sarai Meda and Sarai Miran etc.) were built along its sides, which yielded place to new trading and business centres in the region. During Akbar's time Kannauj became the headquarters of a division (Sarkar) of Agra province (subah). All the ten parganas then included under Kannauj 'sarkar', still form the part of Farrukhabad district (Fig 3.3A). These include Kampil, Kannauj, Saurikh, Sakhrava, Sakatpur, Shamsabad, Bhojpur, Talgram, Chhibramau and Sikandarpur Adhu. The land was allotted to fiefs and 'jagirdars' in lieu of fixed land revenue (consisting of agricultural produce, soldiers and horses). "The new policy of revenue assessment based on land measurement and agricultural produce, encouraged the growth of agriculture, village markets, and settlements in the region" (Tiwari, 1984, p.61).

The territory later on came under the possession of Bangash Nawab, Mohammad Khan (b. 1665 d. 1743 A.D.), who founded towns like, Kaimganj, Mohammadabad and Farrukhabad etc. Kannauj now lost much of its glory and the seat of administration was shifted to Farrukhabad. During long period of Muslim rule many Rajput princes were dispossessed of their territory and were forced to embrace Islam in order to avoid wrath of the Muslim rulers. With the

increase of population, new villages were founded by Muslim Nawabs amongst whom mention may be made of Mohammadabad, Kaimganj, Kamalganj and Nawabganj etc. The names of many old Hindu settlements were changed adding Arabic or Persian prefixes and suffixes.

3.23. MODERN PERIOD :

(a) British Period :

During the last part of the Muslim rule insecurity prevailed in the region owing to the growing rivalry between the Nawabs of Farrukhabad and Oudh, Rohillas and Marathas. Consequently the Britishers forced the treaty of cession on the Nawab of Oudh (1801) and Farrukhabad (1802) taking possession of the whole district. With the introduction of British rule peace and security were restored to the region and efforts were made to encourage the development of railways, roads, canals, agriculture, trade and commerce.

For the proper distribution of agricultural goods a number of rural markets like Kaimganj, Mohammadabad, Khudaganj, Tirwa, and Thatia, etc., were established. These trade and commerce centres were linked with new roads. Laying down of the railway lines (i) metre gauge, from Kanpur to Kasganj via Farrukhabad, and (ii) broad gauge, from Farrukhabad to Shikohabad, further enhanced the accessibility of the district. The development of new transport routes led to the growth of new trading centres

like Gurshaiganj, Khudaganj and Kamalganj, etc., while old towns like Shamsabad and Kannauj etc., situated along the river bank, started to decline.

Britishers introduced a new system of land reform under which land revenue was settled with the 'zamindar' who in turn collected revenues from the tenants by applying harsh methods. This alongwith the unfavourable policy of the government towards cottage industries made the rural life poor and burdensome.

(b) Post-Independence Period :

The new era of economic development began in the region with the attainment of Independence in 1947. With the launching of Five Year Plans since 1950 a number of rural development programmes have been taken upto remove rural poverty, illiteracy and economic backwardness. As a result of which there has been considerable improvement in the health and hygiene of the people, leading to the phenomenal growth of population and consequent dispersal tendencies in rural settlements. The new policy of the government to connect all villages above 1500 population by all weather link roads have encouraged the growth of new settlements near the transport junctions. Similarly the consolidation of holdings has enabled farmers to build cattle shed and pump house (for pumping set) in their individual plots away from the main village. The growing pressure of population and rapid extension of Transport

and Communication lines have led to the gradual shrinking of the forest cover and consequent extension of the agricultural land. On administrative side 'pargana' and 'Tappa' have lost their importance yielding place to 'Tahsil' and 'Development Blocks'. In order to co-ope up with new economic situations farmers are going for intensive agriculture putting emphasis on the cultivation of cash crops. For exchange consumer goods and food stuff between rural and urban areas new hats and market centres are emerging in hither to backward areas.

3.3. MODELS OF SPATIO-TEMPORAL DIFFUSION OF SETTLEMENTS :

The history bears a testimony that, the settling process does not take place at one time or haphazardly, but in different periods, spreading over in a systematic manner. In all the cases the centre of initial beginning remains the core of whole settling process, and the process of diffusion centres round the ~~the~~ notion of radial dissemination from it. The organised sequences of colonization can be studied by detailed field investigation and rigorous analysis of relevant data.

Though a number of scholars like Turner (1920), Bowman (1931), Joery (1932), Carl Sauer (1936) and Stanislawski (1946) have initiated studies on spatial diffusion, but it was a Swedish geographer, Hagerstrand (1952), who made a significant contribution in this field. Calling it as "propagation of innovation waves", in support

stage, which marks the origin and evolution of initial agglomeration, (ii) diffusion stage, in which due to strong centrifugal tendency for outward dispersion new centres are evolved, (iii) condensing stage, characterised by increase in all the location, and (iv) saturation stage, presenting a general but slow asymptotic increase towards the maximum.

Bylund (1960), another important contributor from Sweden, investigated the colonization process in Central Lappland area, with two basic assumptions; (i) the physical conditions of the land are equal all over the areas, and (ii) further areas will not be settled until those close to 'mother settlements' have been occupied. In support of his findings, he suggested four theoretical models of settlement diffusion, each characterised by four stages of growth and differing from one another in the number and the location of the 'mother settlements' (Fig.3.6A). He also suggested two distinct phases in the colonization process: (i) initially immigrants come from long distance and make their first agglomeration in the area, (ii) coming out from the orientation node they make (secondary) settlements at a short distance from the initial agglomeration.

This fact was corroborated by Sadner (1961) who studied the Spanish colonization in Costa Rica, and pointed out that during the settling process 'mother settlements'

serve as basis for later 'off springs'. His idea is helpful in the study of such regions where primary clan stronghold played important role in the evolution of later clan settlements in response of the demand for more space to accommodate increasing number of population.

Morril (1962) presented a probabilistic model of settlement evolution within the frame work of stochastic theory, by using Monte Carlo simulation. He observed the development of a settlement hierarchy around the initial settlement as governed by a sequence of random numbers.

Among Indian geographers, the significant contribution on settlement diffusion has been made by Kashi Nath Singh (1960). He suggested a 'Simulative Structural Model' showing the evolution of basic rural territorial system and settlement types in a part of Eastern Uttar Pradesh. Under the four sets of basic assumptions, he based his semi - deterministic formulations on kinship organization, population growth and expansion of territorial occupance. According to him the entire occupance area of the clan is occupied within the five time-periods through fifteen generations or about 300-400 years.

By applying the idea of plant ecology in the study of settlement evolution in six Iowa countfies, Hudson (1969), divided the whole settling process into three

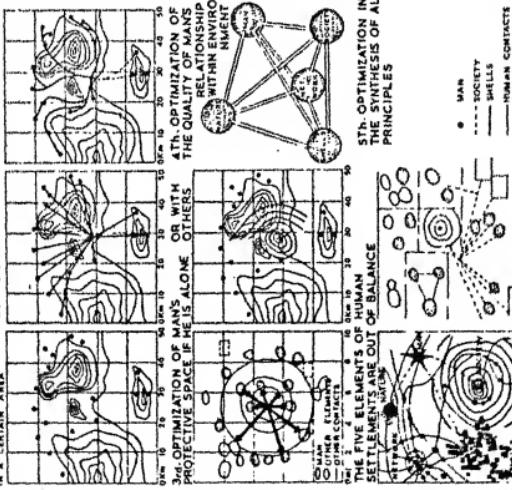
stages: (i) colonization, marked by the expansion of occupied territory of the population (ii) spread, characterised by the increase of settlement density with a tendency to short distance dispersal, and (iii) competition, which brings the decline in density and so makes regularity in settlement pattern,

Doxiadis (1969) suggested five principles of settlement formation (Fig. 3.4) viz., (i) maximization of man's potential contacts with nature and culture elements, (ii) minimization of efforts required for the achievement of man's actual and potential contacts according to the general principle of least efforts, (iii) the optimization of man's protective space at every moment individually or in a group, in any situation and locality; (iv) the optimization of the quality of man's relationship with his environment, i.e. nature, society, shell and net work; and (v) organization of settlements in an attempt to achieve an optimum synthesis of above four principles.

The latest theory of settlement diffusion has been produced by Haggett (1972). In his "Expansion Model" he studied three phases of spread, i.e. (i) low density colonization in the initial phase with a random settlement pattern, (ii) built up of the population in the old colonized areas with secondary infilling of previously empty areas, and (iii) urban competition characterised

FIVE PRINCIPLES OF SETTLEMENT FORMATION

1st. MAXIMIZATION OF POTENTIAL CONTACTS
2nd. AT A MINIMUM OF EFFORT IN TERMS OF TIME AND COST
3rd. SELECT THE LOCATION WHICH ALLOWS A MAXIMUM POTENTIAL CONTACTS
4th. OPTIMIZATION OF MAN'S PROTECTIVE SPACE IF HE IS ALONE
5th. OPTIMIZATION OF MAN'S PROTECTIVE SPACE IF HE IS ALONE



COLONIZATION PROCESS IN MOHAWA MMADABAD PARGANA

5
0
10
KM

INITIAL STAGE
(BEFORE 1250 A.D.)



FIRST STAGE
(1250-1650 A.D.)



SECOND STAGE
(1650-1850 A.D.)



THIRD STAGE
(AFTER 1850 A.D.)

ADDITIONAL SETTLEMENTS
INITIAL AGRICULTURES
1. FIRST STAGE
2. SECOND STAGE
3. THIRD STAGE
METALLED ROAD
UNMETALLED ROAD
RAILWAY LINE

FIG. 3.5

FIG. 3.4

by differential growth and decline of centres leading to a more uniform as well as hierarchically structured settlement pattern. The same year Singh and Singh (1972) studied the spatial diffusion of Rajput clan settlements in Varanasi district, and devised a synthesised form of the model presented by Haggerstrand and Bylund and Kashi Nath Singh. They analysed the evolution of Rajput clan settlements into four phases on the lines of Haggerstrand's diffusion waves rather than a stage by stage process.

By applying above described model, the process of spatial diffusion of rural settlements may be studied in Farrukhabad district. It has been noticed that the two phases of dispersion from the origin of orientation node (or initial agglomeration) to the foundation of destination node, as advocated by Bylund in his model, are applicable here. In the first phase early settlers covered long distances to establish their initial agglomeration while in the second phase short distance migration. Out from the initial node is well marked. But this generalisation does not hold universal applicability owing to differences in methods of spatial organization and community control over land tenure of different clans. Hence, the process does not justify the second assumption of Bylund which holds that "further areas will not be settled until those close to the 'mother settlement' have been occupied".

The process of Rajput colonization in the district shows that secondary clan centres were established at a distance from the clan centre, and the gap between the two decreased during the later stages. Similarly only two phases of colonization and spread from Hudson's model are applicable in the region while the third phase of competition leading to decline in density and regularity is questionable. Hence, four stage model of Haggerstrand, five-time periods of Kashi Nath Singh, five principles of settlement formation by Doxiadis, the first two phases of Hagget and the four phase sequence of Singh and Singh, may form basis for evolving a three phase sequence of colonization process in the study area. These include: initial phase marked by the formation of initial agglomeration by migrating clans followed by stage I colonization (before 1500 A.D.), stage II, spread or diffusion (1500-1800 A.D.), and stage III, saturation (after 1800 A.D.).

The initial phase starts after the death of Harsh (648 A.D.) when Rajputs pushed by Muslim invaders migrated from Rajputana, Malwa, Rajasthan, Delhi and Rohilkhand etc. to build their initial agglomeration in the region. During Jaichand's regime, they colonized major part of the study area, after driving out native tribes of Meos which is marked by the first phase of settlement evolution. In the second phase the population, as well as, the number

of immigrants increased as a result of which new colonies from the parent settlements started moving to hither to unsettled areas. This led to massive clearing of forested tracts and cultivation of usur lands. The third phase is characterised by the outgrowth from the secondary agglomeration due to (i) socio-economic changes in the land tenure system; (ii) declining importance of defence oriented clan agglomeration; (iii) changing political significance of clans and lineages, and (iv) technical improvements in water supply, land management,etc.,(Chisholm, 1968, p.99). This phase has started with the beginning of the 19th century A.D. The phenomenal growth of population has forced people to cleanup remaining forested tracts or reclaim usur or uncultivable lands to be used for agricultural activities or erecting buildings for homes and factories. If this rapid growth of population remains unchecked the days are not far off when region will reach the full saturation stage of settlement formation disturbing the entire ecological balance and threatening the very survival of man.

3.3.1. Spatial diffusion of Rathor Rajput Clan Settlements:

Rathor Rajput clan, one timerulers of the Kingdom of Kannauj, are now confined to Farrukhabad tahsil of the district. Claiming their descent from Kusha, the son of Rama, they initially ruled over Maharashtra and neighbouring parts of South India for about 400 years. But when Solanki's forced them to leave out the throne (by the end of 10th century A.D.), they moved towards north. Their first

ancestor to the study area was Yasovigraha, who was given shelter by Rajpal, the Parihar king of Kannauj. In 1019 A.D. the king of Kannauj showed his cowardice against Mahmud's attack and thereby invited the wrath of other Hindu rulers, who forced him to relinquish the throne. Consequently Chandra Deva, the grand son of Yasovigraha, found the favourable conditions to occupy the throne of Kannauj. Fifth in lineage from him came Jai Chand (1170 A.D.), who was the last Hindu ruler of the region. Recent findings prove that Jaichand belonged to Gaharwar dynasty and a section of scholars believe that Rathor and Gaharwar are two branches of same clan of Rajputs (Singh, 1954, pp.5-6).

To make his kingdom strong and secure he invited many Rajputs from neighbouring parts of the country, and gave them shelter. His rule continued till 1194 A.D., when he was defeated and slain by Mohammad Ghori. His elder son, Jaypal, took shelter at Khorgarh (now Shamsabad), at the right bank of Ganga, while his younger son Rao Prahasta moved to Mahoi. Khorgarh was destroyed by Sultan Shamsuddin Altamash (Delhi) who founded Shamsabad on its ruins (1214 A.D.).

Raja Karan, who was among the 'Umraos' (governors) of Behlol Lodi, was expelled from Khorgarh (Shamsabad) by the king of Jaunpur, by the middle of 15th century. He moved to Usehat, in Budaun district. Following the family

disputes his grand son, Raja Pratap Rudr, migrated to Bilsagarh (now Bilsar in Etah district) in 1555 A.D. His younger son Rao Udaichand made the re-entrance in the district and settled at Mau Udaichand (now Maudha, in the north of Mahoi) in 1583 A.D. He finally moved to Khimsepur, 10km. west of Maudha. The eldest son of Udaichand, Rao Karan Sen, remained at Khimsepur while his brother Laxmi Narayan Singh migrated to Etah district, where his descendants are still found in Baragaon (Nayagaon) and Kharchuliya. Other brothers like Chaturbhuj Singh settled at Mudgaon, Ram Singh at Arsani and Sakat Singh at Sakwai.

Due to constant increase in population, several out growths from these 'primary settlements', moved to surrounding areas, and a number of new villages were founded between 1600 and 1800 A.D. Man Singh, the son of Chaturbhuj Singh, colonised Mangarh (now known as Jhinjuki), while descendants of Ram Singh settled at Isepur, Chausepur, Jetpur and Kairodaha, along the bank of Isan river. Har Singhpur, Madanpur, Dheernpur and Jeonta fillages were developed in the outskirts of Khimsepur, while one family moved to Rajepur Rathori and another to Chhibramau (Fig. 3.6B).

The third stage of spatial diffusion starts after 1800 A.D., when a regular growth of population gave birth to new settlements. Here mainly second stage centres

SPATIAL DIFFUSION OF RATHOR RAJPUTS

FAARUKHABAU UTSIKI

66

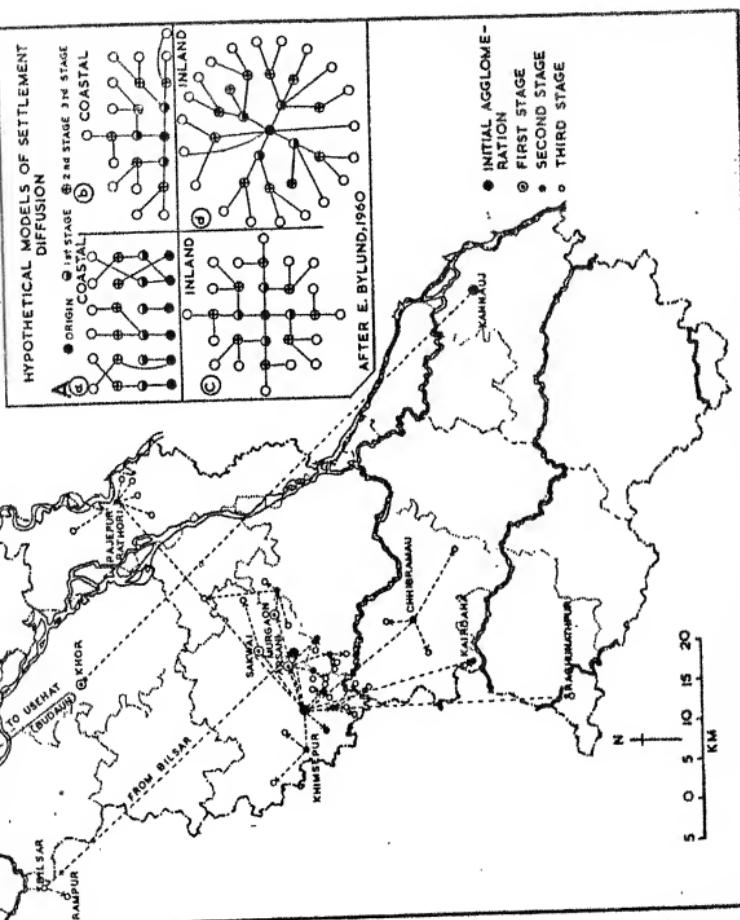


FIG. 3.6

acted as mother settlements. The main villages founded during this period include Bighamau, Arjunpur, Sanaura Ishwari, Sanaura Prithi, Khiriya Mukund, Ganeshpur, Fareedpur, Dalupur Sultanpur, Nawada, Haiderpur, Ugarpur Sultanpur Patti, Nehraiya, Raispur, Karanpur, Gosarpur, Chauki Mahmoodpur, Miyamatpur, Ugarpur, Dabari, Tusaur, Barua, Jainapur Maheshpur, Karan Datt, Aseh, Khubariaur, Balrampur, Shespur and Raghunathpur, etc. (Fig. 3.6B).

3.3.2. Colonization Process :

In order to substantiate above facts Mohammadabad pargana (Fig. 3.5) has been selected as a case study for analysing the actual settling process in the study area:

(a) Mohammadabad Pargana :

This pargana, comprising of 43 villages, occupies the central part of the district. Being nearer to the Ganga (in the east) and Kalinadi (west and south) and surrounded by ancient sites of Sankisa (7 km in the west), Kampil (40 km. in the north) and Kannauj (55 km. in the south-east), the area was easily accessible to the early settlers of the Doab land, ever since the dawn of the human civilization.

Prior to the advent of the Rajputs, the pargana was the strong hold of Meos and Bhars. To extirpate these aboriginal tribes and bring them under the rule

of Kannauj Jaichand (1176-1193 A.D.), the last Hindu king of the area, invited Man and Sahraj, descendants of Nikumbh Rajput clan, from Narwal in Kanpur district. They succeeded in conquering the Bhars in eastern part of the pargana and were allowed to settle in all 24 conquered villages. In this way the first Rajput colony of Nikumbhs' was built in the pargana by the end of the 12th century A.D. Selecting three villages at the three corners of their conquered area, Man settled at Ku reli, Sahraj at Daheliya, while Daraundi (now Daraunda) was granted to their family priest, a Brahman. Their descendants are still found in these and the nearby villages.

Similarly Chandel Rajputs came to the area in the beginning of the 13th century. Their ancestor Sobhajit Singh was called from Sheerajpur (also in Kanpur district) to get the remaining part of the pargana cleared from Bhars. He took help of Sabal Ahir of Mainpuri and drove out the aboriginal tribe from 27 villages in the western part of the pargana.

Their first settlement in the pargana began at Kilamapur (now a hamlet of Mohammadabad), which is still their regional headquarter. At about 3 km. from Kilmapur, Sabal Singh Ahir built his initial settlement at Rohilla, after the name of his original place in Bhongaon, Mainpuri.

His descendants are still found in this area. Other villages, occupied by Sabal Ahir and his descendants, now lie outside this pargana. Descendants of Chandel Rajputs founded villages like Harkampur, Karthia, Bararikh, Almapur, Rascolpur urf Bharatpur, Hameerpur, Pasinagpur and Ghazipur.

The third wave of settlers came after Rathors were expelled from Khor, and Rao Udaichand, the great grand son of expelled king Karan, in 1583 A.D., settled on the vast unoccupied land between Nikumbh and Chandel colonies, and named it Mau Udaichand (now Maudha). His five sons built their colonies around Maudha, e.g. Chaturbhuj Singh at Mudgaon (in the north east), Ram Singh at Asrani (in the west), Sakat Singh at Sakwai (in the north) and remaining two sons at Khimsepur and in Etah district. All these settlements are supposed to be developed around 1600 A.D. Later on grand sons of Chaturbhuj Singh moved to Gosarpur, Jhinjuki and Niyamatpur in the eastern part of the paragana. During this phase a number of Rathor villages like Nahraiya, Chausapur, Jaitpur and Lakhrauwa etc., came into being (after 17th century A.D.).

While Rathors were busy in colonizing in southern and central parts of the paragana, the Gaurs made their entrance in the northern part of the area, during 16th century. Their ancestor Sarha and Barha, two Gaur brothers, came from Katehar in Shahjahanpur and occupied 84 villages in

Farrukhabad district, of which only one village Tera lie in this pargana.

The outgrowth of population minimised the initial gap between these four Rajput colonies. The construction of the road, through the heart of the pargana connecting Farrukhabad with G.T. road, gave rise to a number of road side villages. Similarly the railway line, parallel to the road, was another plus factor for the growth of new settlements during the last two centuries.

Nikumbh settlements were spread out more rapidly owing to their first arrival, occupation of the fertile land and the proximity of the Ganga and the district headquarter. Chandels fanned out along the road, west of Kilmapur (Mohammadabad), where Kharawa Nadi provided them some relief from the scarcity of water. Rathors had a good chance to develop their settlements in the vast central part. But the sandy nature of soil restricted their development forcing them to move Khimsepur, located at the border of the pargana. The growth of Gaur settlements was also not very encouraging owing to infertile soil and paucity of water.

In this way whole pargana witnessed a dense and compact growth of settlements. But the central part of the region remains under developed due to low fertility

of soils and scarcity of water. Here vast expanse of waste lands occupy the inter village space. It is also noteworthy that due to the sandy soils and lack of big rivers, most of the villages have been developed near the ponds or lakes, amongst whom mention may be made of Mohammadabad (Kilmapur, Rohilla), Harkanpur, Sikandarpur, Alamalpur, Karthia, Hameerpur, Maudha, Lakhrauwa, Nahraiya, Chausapur, Jaitpur, Gosaipur, Sakwai, Tera and Nisai etc.

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CHAPTER - 4SPATIAL DISTRIBUTION AND TYPES OF RURAL
SETTLEMENTS

Settlements, like any other space phenomenon, evolve some pattern on the geo-plane whose analysis is very important not only for examining the current spatial pattern but forecasting the future trends of growth. It is with this objective in mind that an endeavour has been made in the present chapter to study the size, spacing, nature of dispersion and types of rural settlements in Farrukhabad district so as to prepare sound basis for suggesting suitable guidelines for planning and rural development.

4.1. GENERAL DISTRIBUTION AND SITING OF RURAL SETTLEMENTS :

The distribution of rural settlements, in a region, is largely governed by attractive and restrictive forces of physical environment in the form of topography, climate, drainage, soil and natural vegetation, etc. In the study area the favourable climate, and fertile plains, devoid of major topographical dissimilarities, have led to an overall uniform distribution of settlements. However minor irregularities in the form and size of villages may be attributed to local differences in the fertility of soils, proximity of rivers, occurrence of usar lands, types of

FARRUKHABAD DISTRICT
DISTRIBUTION OF VILLAGES
1981

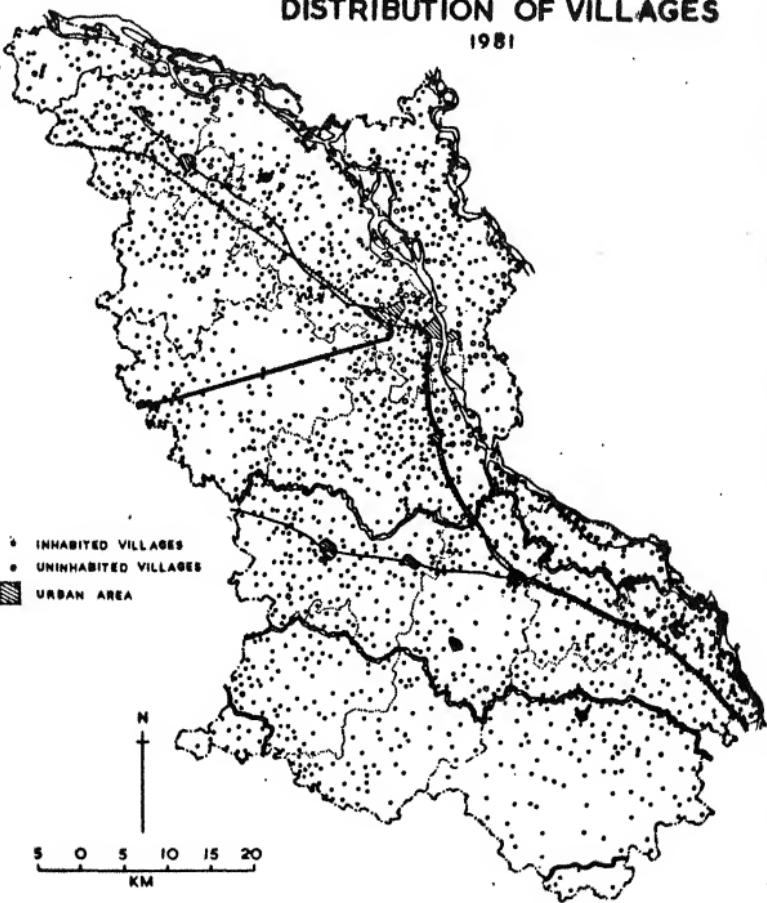


FIG. 4.1

land use and cropping pattern and density of transport and communication network.

Figure 4.1, showing the distribution of villages in the study area, exhibits their general concentration in the Khadar belt of the Ganga which is accidentally the most accessible area in respect of road and rail Transport net work. The belt houses the district and three tahsil headquarters besides a number of growing urban centres and large villages. Besides transport accessibility this tract is characterised by good fertile soils which grow cash crops like potato, maize and tobacco, etc. The river (cluffs) former meanders of rivers forming oxbow lakes, etc. provide suitable sites for the location of villages (Fig. 4.2 A,B,C).

Another such concentration of settlements is noticed in the northern part of the Kannauj and Chhibrampur tahsils. Here the proximity of the old capital city Kannauj and the benefit of the G.T. Road are well marked.

The site of the rural settlements has been very much influenced by the proximity of the water bodies and fertile soils. During the course of field investigation it has also been noticed that many Rajput settlements are located near the sites of the old aboriginal villages. Similarly large rivers like Ganga, Kalinadi and Isan attracted the siting of rural settlements along their

RURAL SETTLEMENTS: DISTRIBUTION & TYPES

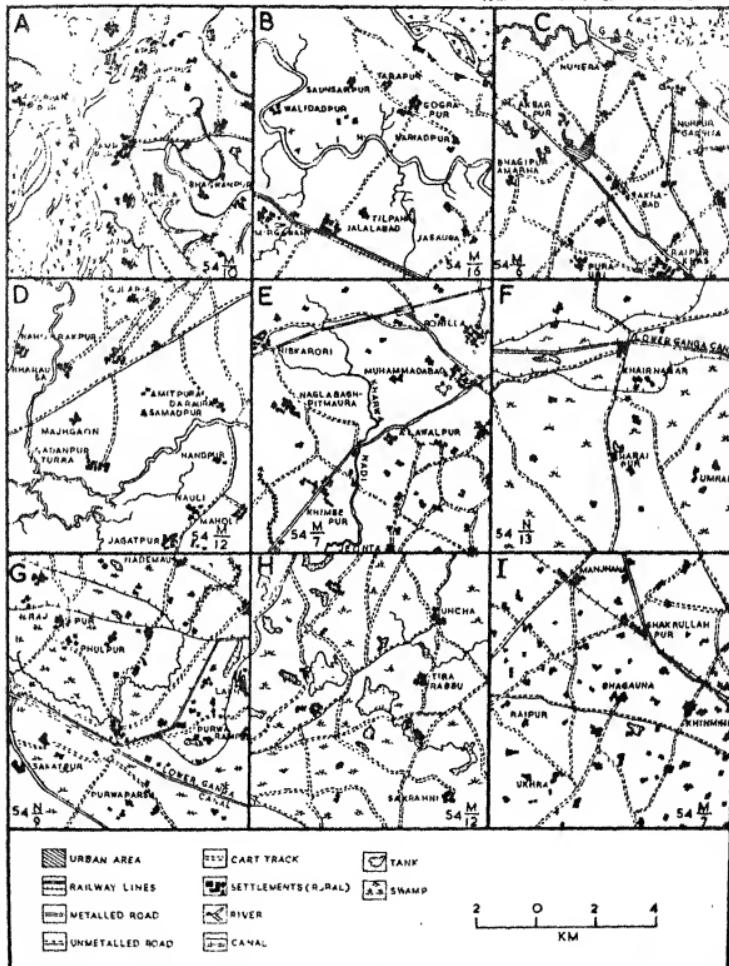


FIG 4-2.

bank) due to the availability of fertile soil, drinking water and river transport facility (Fig. 4.2 A,B,C,D,E).

'Sarais', made along the G.T. road, during Mughal period, have (been) grown into fullfledged settlements e.g., Sarai Prayag, Sarai Daulat, Sarai Gopal and Sarai Miran, etc. Similarly the construction of the railway line, during last century (Fig. 4.2B, E & I) promoted a new set of settlements as rail station, bazars and railway colonies. In recent years the construction of roads (link roads), canals (Fig. 4.2 F,G,I,) and the adoption of land reforms like consolidation of land holdings have encouraged villagers to move to new sites located along the transport junctions or in the consolidated plots to supervise farm activities.

Figure 4.1 shows low concentration of villages in the southern and western parts of the district owing to the lack of transport net work, less fertile soil, presence of vast expanse of usar and low lying water logged areas, etc. Big rivers like Ganga etc., which flood their Khadar lands during rainy season, are temporarily settled during summer season and are vacated during rainy seasons.

4.2. SIZE OF VILLAGES :

4.2.1. Based on area :

The average size of a village in Farrukhabad district

comes to about 2.43 km², which is slightly higher than the state average of 2.34 km². However in the area, characterised by the fertile soils and good transport facilities, the areal size of villages is smaller, e.g., Barhpur (1.56 km²), Kannauj (1.74), Kamalganj (1.79) and Shamsabad (1.99) blocks have less than 2 km.² of area per village (Fig. 4.3A). On the other hand, the lack of transport facilities in Umarda (4.96 km.²) and Haseran (3.72) blocks, and the sandy patches in Mohammadabad (3.38) are the factors responsible for the big areal size of villages in the southern and west central part of the region. Kunwa Kherha Wazir Alam Khan village, in Shamsabad block, has the credit of covering the largest area (21.14 km.²) in the whole district. However, the region is generally dominated by small areal size of villages; about 60% of the villages of the study area have less than 2 km² of area, while only 14% of them have larger size over 4 km.² (Table 4.I).

TABLE 4.I
SIZE OF VILLAGES (BASED ON AREA)

Area Groups (km. ²)	Percentage of villages
< 1	26.1
1-2	33.5
2-4	26.4
4-8	10.5
> 8	3.5

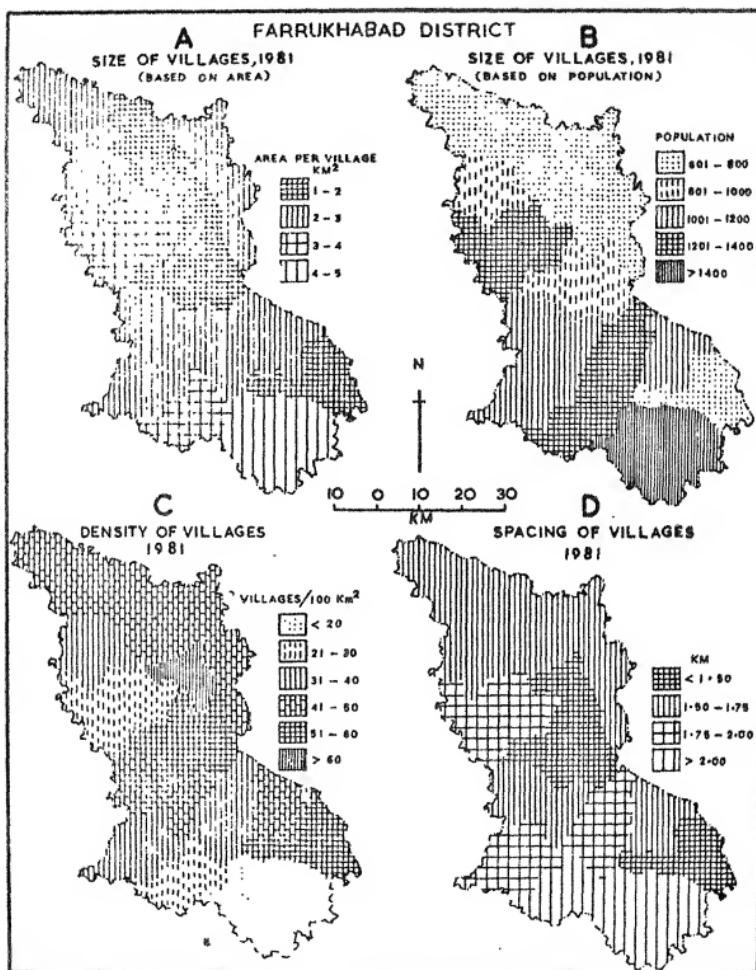


FIG. 4-3

4.2.2. Based on Population :

The average population size of villages, in Farrukhabad district, comes to 923 persons. However its values range from 612 persons in Rajepur block to 1617 in Umarda block (Fig. 4.3B). There are six development blocks where the population size averages are lower than the regional average whereas in remaining eight blocks these are higher than the district figures.

Table 4.II shows that the study area is dominated by the small sized villages, 70% of which house less than 1000 persons per village. On the contrary, large sized villages (with more than 5000 persons per village) are very few in numbers (19 villages or 1.1% of the total villages), mostly concentrated in southern part of the district. About 41% of the regions population resides in villages with less than 1000 inhabitants, leaving out a small percentage of 6.7% for large villages with more than 5000 people. Mohammadabad, with a total population of 12,224 persons, has the credit of being the largest village in the district. A close look of figures 4.3A and 4.3B clearly exhibits that villages situated in the eastern part of the district along the Ganga have smaller areal and population size, whereas those located in the illdrained tracts of south or Usar infested lands of the west are characterised by larger population and areal size.

TABLE 4.II

SIZE OF VILLAGES
(BASED ON POPULATION)

Popu lation Groups	Percentage of villages T A H S I L S					District average
	Kaim- ganj	Farrukha bad	Chhilibra mau	Kannauj		
Unin- habited	12.9	13.8	2.3	13.4	10.9	
≤ 200	9.5	6.4	5.1	3.6	6.3	
200-499	24.2	23.0	22.9	16.9	22.0	
500-999	31.2	27.3	33.8	29.5	30.2	
1000-1999	15.6	21.0	23.2	24.6	20.9	
2000-4999	6.4	7.7	10.1	11.2	8.6	
5000-9999	0.2	0.5	2.6	0.8	1.0	
$> 10,000$	~	0.3	~	~	0.1	

4.3. SPACING OF VILLAGES :

The theoretical distance among villages depends upon their density in the Unit area. Farrukhabad district, which has an average density of 41 villages per 100 sq.km. of area (Fig. 4.3C), records an average inter-village-spacing of 1.68 km. (vide table 4 III). This inter-village spacing, calculated by the following formula* of Mather, (1944) varies between the lowest value of 1.34 km. (Barhpur block) and highest value of 2.39 km. (Umarda)

and is negatively correlated with the village density but positive relationship with village size. That is why villages located in the southern and western parts of the district have high spacing whereas those on the east and north have low spacing. On the basis of these findings following spacing categories of villages may be identified in the region (Fig. 4.3D).

4.3.1. Low Spacing (≤ 1.5 km.) :

It includes three blocks along the western bank of the Ganga, covering 18% of the study area. The lowest intra-village spacing is recorded in Barhpur block (1.34 km.) followed by Kannauj (1.42) and Kamalganj (1.44) blocks. The area occupies the most fertile land of the Ganga Khadar, enjoying good transport facility and rich cultural heritage. This has led to the emergence of several hamleted and semi-compact villages in the area. The average areal size of the villages, in these blocks, ranges from 1.56 to 1.74 km^2 , and that of population size between 684 and 818 persons per village. Similarly the village density varies from 56 to 64 villages per 100 km.^2 (hamlet density being 12-16 hamlets per 10 km.^2).

$$* D = 1.0746 \sqrt{A/N} \quad \text{OR} \quad 1.0746 / \sqrt{d}$$

Where D = Desired distance between points in hexagonal arrangement,

A = Area of the block,

N = Number of settlements per block.

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TABLE 4.III
SPACING AND NATURE OF DISPERSION OF RURAL SETTLEMENTS

Sl. No.	Blocks	$d/\sqrt{a^2}$	D	R _A	R _E	R _N	V	σ_{RE}	C	D ₁
1.	Kaimganj	0.48	1.54	0.905	0.719	1.259	0.142	0.028	6.57	0.583
2.	Nawabganj	0.39	1.72	1.011	0.801	1.262	0.175	0.044	4.76	0.587
3.	Shamsabad	0.50	1.51	0.9	0.705	1.276	0.137	0.028	6.99	0.592
4.	Rajepur	0.48	1.54	0.882	0.718	1.228	0.142	0.029	5.62	0.568
5.	Barhpur	0.64	1.34	0.745	0.624	1.194	0.107	0.032	3.75	0.554
6.	Mohammedabad	0.29	1.98	1.072	0.920	1.165	0.235	0.044	3.46	0.537
7.	Kamalganj	0.56	1.44	0.827	0.669	1.236	1.122	0.026	6.17	0.576
8.	Chibbaramau	0.41	1.68	0.917	0.783	1.171	0.167	0.035	3.77	0.546
9.	Talgram	0.36	1.79	0.999	0.835	1.196	0.190	0.043	3.82	0.557
10.	Sauri kh	0.37	1.77	1.063	0.826	1.287	0.185	0.044	5.41	0.598
11.	Haseran	0.27	2.07	1.144	0.964	1.187	0.253	0.067	2.70	0.553
12.	Jalalabad	0.44	1.62	0.847	0.755	1.122	0.155	0.041	2.25	0.523
13.	Kannauj	0.57	1.42	0.762	0.661	1.153	0.120	0.027	3.75	0.555
14.	Umarda	0.20	2.59	1.394	1.114	1.251	0.341	0.056	4.93	0.580
	Farrukhabad District	0.41	1.68	0.937	0.781	1.200	0.167	0.009	16.09	0.558

4.3.2. Medium Spacing (1.5 - 1.75 km.):

As many as six blocks, covering over 42.3% of region's area, fall in this category. Four blocks namely Shamsabad (1.51 km.), Kaimganj (1.54), Rajepur (1.54), and Jalalabad (1.62) are located near the Ganga, while remaining two (Chhibramau 1.68 km, and Nawabganj 1.72 km.) lie along the old transport routes. Here average area of the village ranges between 1.99 and 2.57 km.², with population size varying from 612 to 1023 persons per village. Similarly village density varies from 39 to 50 villages per 100 km.² (hamlet density being 8-13 hamlets per 10 km.²), giving way to scattered and semi-complex types of settlements.

4.3.3. High Spacing (1.75 to 2.0 Km.):

This category includes three blocks, namely Saurikh (1.77 km.), Talgram (1.79) and Mohammadabad (1.98) covering 22.3% of the study area. Here sandy (usar) and infertile soils and the low lying tracts lead to low density of villages (30-37 villages per 100 km.² of area) and larger areal (2.73-3.38 km.²) and population size (1015-1353 persons) of the villages.

4.3.4. Very High Spacing (>2.0 km.):

It includes two southern blocks of Haseran (2.07 km.) and Umarda (2.39), covering 17.4% of region's total area. In terms of development, it is the most backward part of

the district, owing to the problems of water logging infertile soils and less developed means of transport and communication. Here the villages are generally of very big size (average areal size of 3.72 km.² in Haseran and 4.96 km.² in Umarda, and average population size of 1260 and 1617 persons per village respectively). The density of villages varies between 20 and 27 villages per 100 km.² of area (hamlet density being 11 hamlets per 10 km.²) giving way to the compact structure surrounded by numerous outlying hamlets.

4.4. NATURE OF DISPERSION :

Dispersion is an inherent tendency amongst settlements to move from the old and compact village site to more open areas in response of new economic activities. It is also a measure to study the spatial pattern of rural settlements, in terms of randomness, clustering and uniformity. Various statistical techniques have been proposed by the scholars (Stoney 1968, Hudson 1968) to measure the degree of dispersion of which 'nearest neighbour method' (Clark and Evans, 1954 and Butler, 1972) (occupies) wide popularity. Using this method the index of randomness (RN) has been computed for each development block of the study area. On the basis of following formula (Clark and Evans, 1954, p.447 and Clark 1956, pp.373-374):

$$RN = rA/rE$$

where RN = index of randomness,

r_A = mean of nearest inter-village straight line
distance, and

r_E = expected distance

The r_E may be calculated as follows :

$$r_E = 1 / (2 \sqrt{d}) = 2 r_A / d$$

where d is village density

The RN value provides a measure of the degree to which the observed distribution approaches or departs from random expectation (Clark and Evans, 1954, p.447). Theoretically this value may range from 0.0 (complete/maximum clustering) through 1.0 (random) to 2.1491 (ideal or perfectly uniform hexagonal pattern). For further testing, the RN value may be correlated with variance (V), which may be computed as follows (Dacey 1965) :

$$V = (4 - \pi) / 4d \pi = 0.0683086/d$$

When the value of V is higher than r_E the distribution is termed 'clustered' when equal to the latter, it is 'random', and when lower than r_E it is 'regular'. In Farrukhabad district the RN value is above 1.0 in all development blocks indicating a tendency towards regularity. Similarly the value of V is always less than the value of r_E confirming the uniform pattern of settlement distribution.

The significance of rE may be further tested by the hypothesis of 'poisson probability' on the basis of standard error ($\sigma - rE$). Using the following formula, (Clark and Evans, 1954, p.450).

$$\sigma - rE = 0.26136 / \sqrt{(nd)}$$

Where 'n' is the number of total villages in an unit area, and 'd' is the density of villages per km.^2 .

The upper and lower limits of random matching at 95 percent probability level may be computed with the help of $\sigma - rE$ (Singh, 1977 p.57).

$$= (2\sigma - rE \pm rE) / rE$$

The width of the range of randomness is based upon the number of points (villages). If their number is small the range will be large, and vice-versa. In study area RN values for all the development blocks lie above the random range, thus indicating an apparent tendency towards uniformity (Fig. 4.4C).

Though in such analysis the "repeated pattern would yield a low value of RN even when the pattern may appear dispersed" (Getis, 1964), but in case of uniform distribution the method may be suitable. In order to overcome this difficulty, measures of more than first order may be adopted (Barr et al. 1971 & Reddy 1973). In case of the study area the range of RN values varies from 1.122

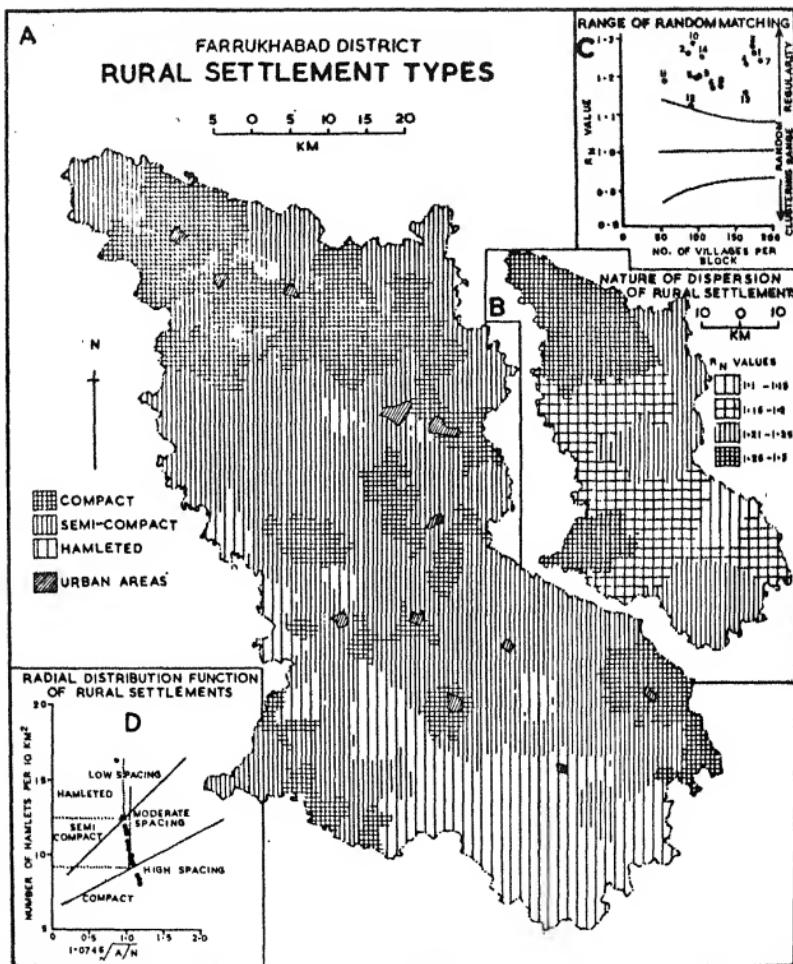


FIG. 4-2

in Jalalabad block to 1.287 in Saurikh block (Table 4.III) indicating a clear tendency towards uniform pattern of village distribution. The variance (V) and the standard error (σ_{rE}) also corroborate this pattern and confirm the finding. Thus on the basis of the RN value following three categories of pattern may be identified in the region.

4.4.1. Very Low Regularity (1.1 to 1.2) :

This group includes seven development blocks (Jalalabad, Kannauj, Mohammadabad, Chhibrampur, Haseran, Barhpur and Talgram) incorporating 44% (1895 km.²) of the region's area. The observed inter-village distance is as low as 0.75 km. in Barhpur, while the village density per 100 km.² comes to 43. The area, lying on the fertile land, is densely populated due to its rich cultural background and well developed means of transport and communication lines.

4.4.2. Low Regularity (> 1.2) :

It incorporates remaining seven blocks covering over 56% (2416 km.²) of the regions area. The observed inter village distance, here, varies from 0.83 (Kamalganj) to 1.4 km. (Umarda), while the number of villages per 100 km.² varies from 20 to 56. The area mostly covers whole of the north and southern portion of the district,

mostly dominated by big sized villages.

The above analysis very well indicates that the trend of dispersion in Farrukhabad district is towards regularity because the empirical variance:mean ratio is always less than 1.00, i.e., the mean in every block is greater than the variance. It also confirms that Dacey's 'Regular Poisson Probability' law holds more relevance in the region. The deviation index of nearest neighbour has also been tested by the use of normalised index of random disturbances whose intensity has been measured by using following equation (Dacey, 1962, pp. 83-96).

$$D_i = rA / (1.0747 / \sqrt{d}) \text{ OR } D_i = rA/d$$

Table 4.III clearly exhibits that the normalised index (D_i) values with nominal difference, lie between 0.523 and 0.598, indicating an apparent tendency towards regular pattern and approving the earlier findings.

4.5. SETTLEMENT TYPES :

Many attempts have been made by the scholars to classify settlements into different types on the basis of their size, shape, siting, and functions etc. The two broad types include (i) dispersed, comprising of isolated farmsteads, and (ii) nucleated, consisting of

TABLE 4.IV
DISTRIBUTION OF VILLAGES AND HAMLETS

Sl. No.	Blocks	Area/ km. ²	No.of villages	No.of Hamlets	Den- sity of villages/ 100 km. ²	Density of Hamlets/ 10km. ²
1.	Kaimganj	366	177	309	48	8
2.	Nawabganj	231	90	202	39	9
3.	Shamsabad	348	175	334	50	10
4.	Rajepur	342	166	336	48	10
5.	Barhpur	159	102	263	64	16
6.	Mohammadabad	413	122	345	29	8
7.	Kamalganj	331	185	398	56	12
8.	Chhibramau	324	132	386	41	12
9.	Talgram	287	103	286	36	10
10.	Saurikh	262	96	278	37	11
11.	Haseran	212	57	230	27	11
12.	Jalalabad	212	93	269	44	13
13.	Kannauj	288	165	335	57	12
14.	Umarda	536	108	578	20	11
Farrukhabad District		4318	1771	4549	41	11

a number of dwellings grouped together in the centre or at one part of the village land. Singh (1975, pp. 32-33) has suggested a scheme to classify settlement types of Varanasi district in Ganga plain on the basis of the number of villages (V_n), number of hamlets (H_n) and occupancy units (OU_n). If the number of villages is equal to the number of hamlets in an areal unit (adalat panchayat), the settlement has been termed as 'compact', if less than half of the hamlet number, it is 'dispersed', and if more than half of the hamlets, it is 'semi-compact'. There are 1771 inhabited villages with 4549 hamlets in Farrukhabad district (Table 4.IV). Using above method there could be hardly any 'nyay panchayat' in the district where the settlements could be termed as 'compact'. Since field observations do not confirm such dispersal tendency in the rural settlements, the scheme has been modified to suit the study area. Hence, the 'nyay panchayats' with hamlet numbers less than two times, four times and eight times than the village number, have been classified under compact, semi-compact and hamleted categories respectively (Fig. 4.4A).

4.5.1. Compact Settlements :

The compact settlements are found in as many as 51 'adalat panchayats' of Farrukhabad district. Occupying the narrow patches along the river banks and around the

old sites, these are spread over throughout the study area (Fig. 4.4A). The danger of floods, occurrence of swamps, defective drainage, and lack of suitable sites for village development, are some of the typical features of such area. In ancient days defence needs has played a major role in the growth of such villages, which are now showing dispersal tendencies in view of new socio-economic conditions.

4.5.2, Semi-Compact settlements :

The characteristics of this intermediary form lie between compact and hamleted settlements. Such villages are invariably surrounded by two or three hamlets around the main village site. Major part of the study area, stretching over 92 'adalat panchayats', fall under this category (Fig. 4.4A). Such villages are mostly confined to the densely populated central part and along the transport routes. Here the rapid rise of population leading to excessive congestion in the old sites, return of peaceful conditions, fiscal reforms, economic development, spreading of transport and communication lines etc. have been the main factors encouraging the dispersal tendencies in recent years (plate no.28). At times hamlets, consisting of people of different castes and communities-- 'Chamrauti', 'Pasiyan', 'Ahiran', 'Teliyan', 'Thakuran', 'Babhanan', and 'Tukkan' etc., have been developed in olden days to fulfil the functional needs under the old 'jajmani' system.

4.5.3. Hamleted Settlements :

Such settlements are distinguished by the presence of a main village site alongwith four or more hamlets around it. "In these loosely connected settlements, a street pattern is generally lacking and the straggling residences are separated by intervening cultivated fields" (James, 1932, pp. 225-234). In the study area a maximum of 10 hamlets are found in Pura Rai 'nyay-panchayat', followed by 9 each in Rampur Manjhila and Umran 'nyay-panchayats'.

Spreading over 25 'nyay-panchayats', such settlements are very common in southern part of the district (Fig. 4.4A). Here the construction of Tirwa distributary of Lower Ganga canal, roads and transport net work, and 'purwa basana' activities of erstwhile 'zamindars', caste system and the presence of usur lands, have led to the formation of hamlets around the villages. Many caste Hindu, agricultural (Kurmi, Koris, Muraos, etc.), business communities (Banias, Telis, etc.) and service castes (Nais, Dhabis, Lohars, Julahas, etc.) have also formed new hamlets near to the field or road sides in response to the new socio-economic conditions (Tiwari, 1979, p. 199).

4.5.4. Dispersed settlements :

Except some isolated seasonal huts in the flood prone area of Kaimganj tahsil, true dispersed settlements

are no where seen in the district. These temporary huts are constructed after rainy season to grow rabi crops and summer vegetables (including melons) in Khadar track of the Ganga river (Plate No.2).

Figure 4.4D shows the relationship between the theoretical spacing (D) and density of hamlets per 10 km^2 (d), exhibiting the distributional pattern of hamlets in the region. It is evident from the figure that there is inverse relationship between spacing and density which may be utilised for classifying rural settlement types. In general, hamleted settlements and high density of hamlets; semi-compact settlements by moderate spacing and medium density and compact settlements by high spacing and low density (Fig. 4.4D).

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CHAPTER - 5MORPHOLOGICAL STRUCTURE OF RURAL SETTLEMENTS

Morphology, which is primarily concerned with the layout, plan, street pattern and internal structure of settlements, is an important aspect of modern settlement studies. It not only views inhabited part of the village in respect of physical space but analyses its various components in terms of socio-economic space which determines the functional characteristics of settlements. Hence morphological structure not only determines the economic viability of the settlements but examines its prospect for responding to new socio-economic changes in the light of rural transformation and development. In the present chapter an attempt has been made to examine the morphological components of rural settlements - such as field sizes and field patterns, village-farm distance, land ownership and land-use pattern, socio-spatial structure and shape characteristics of villages in the study area, so as to suggest suitable guidelines for accelerating the pace of rural development.

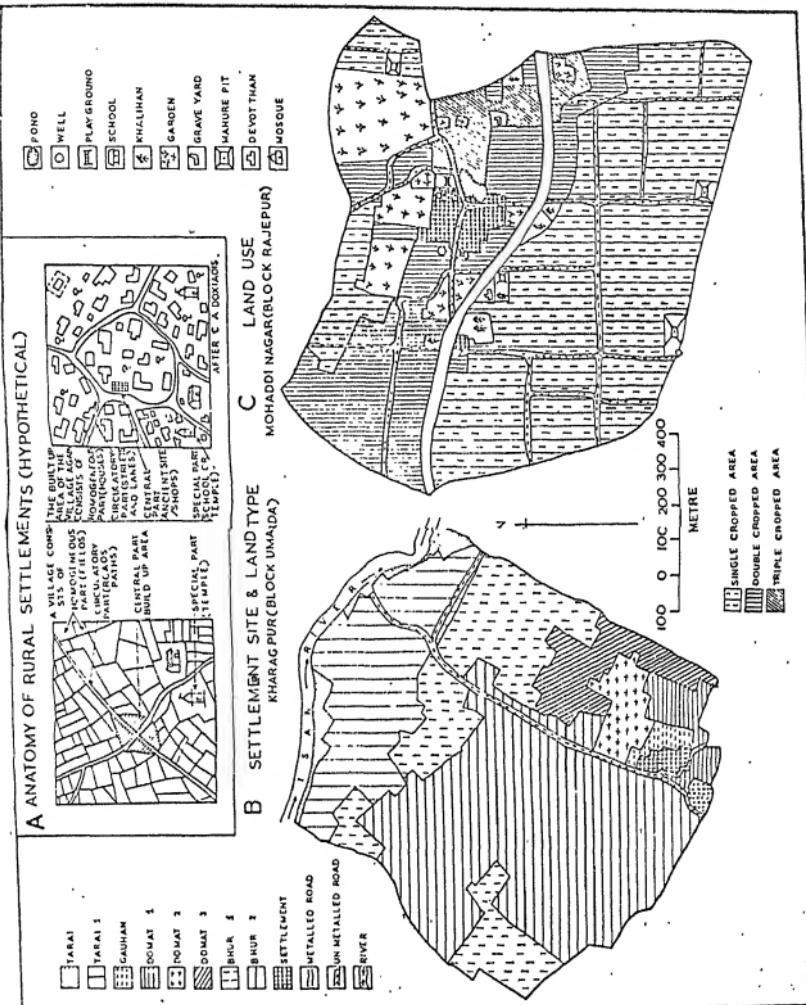
5.1. MORPHOLOGICAL COMPONENTS OF THE VILLAGE

|| A village may be defined as the smallest revenue-cum-administrative unit (mauza) having a main habitation

site surrounded by one or more hamlets all around. It generally consists of four different parts (Fig. 5.1A) as follows (Doxiadis, 1968, p.24): (1) Homogeneous part, consisting of fields, pasture lands, groves etc., was earlier covered by thick forests or pasture lands. The fields nearer to the inhabited site are rich in manures (called Gauhan) and grow more than two crops while those located on the periphery of the village (called 'Palav', Manjha, Domat, Bhur, etc.) are less fertile growing only one crop in a year (Fig. 5.1 B and C).

(ii) Circulatory part, consisting of roads, streets, lanes etc. play vital role in connecting the row of dwellings and fields. These are also the links between different villages or rural and urban areas.

(iii) Central part, which is the nucleus of the built-up area, includes clusters of 'kuchcha' or 'pucka' houses. In large villages built-up area generally consists of a main village and one or more hamlets within the territorial limit of the village. The original and the main inhabited site is called 'khas gaon', while the subordinate cluster of houses are known as 'purwa', 'pura', 'patti', or 'tola' etc. and are generally named after the dominant castes residing therein.



(iv) Special part, comprises of temple, school and panchayatghar etc. It generally occupies the space within the inhabited area or at the outer limit of the village territory. Sometimes these are built in the intervening space lying between the two clusters of houses.

5.1.1. Intra Village Spacing :

The intra-village space denotes distance between the residential site and the field, which are the two main components of a village. The built-up site and the farms in a village are complementary to each other, whereas the economic as well as socio-cultural activities are performed in the built-up area, the actual economy is derived from the fields. The lanes and roads connect these two important parts with each other. Hence, the study of the distance of the farm from the built-up area, the ownership of the land, the size and patterns of the fields and the socio-spatial structure are very important parts of intra-village spacing.

(a) Village-farm distance :

Various factors like security, socio-cultural needs encourage people to live in groups and clusters in compact settlements. But for his economy and livelihood he has to depend upon his fields and, hence, has to pay daily visits to and from there. In many cases the

inhabited site is located in the corner of the village, instead of in its centre. So a farmer has to spent a lot of time and energy in reaching to his farm. Prior to the enforcement of the consolidation of Land Holding Act by U.P. Govt. (1953), a farmer owned a number of small plots in different parts of the village, upon which agricultural activities were time consuming and un-economical. The law of inheritance, providing divisions of landed property of a father into his sons, made the fields to go smaller and smaller. Also a farmer generally owns plots in a number of neighbouring villages upon which the farming activities are difficult to be performed. Hence the consolidation of holdings Act gave them much relief whereby not only small scattered plots were consolidated into big plots (Chaks) but lands owned in the neighbouring villages were brought nearer to their homes. But there are certain loopholes in the Act which are to be plugged to make scheme more effective and acceptable to the villagers. Many farmers have built small farm houses in their respective plots to keep cattle, farm machineries and pumping set etc. and a new tendency of dispersion away from the congested old site is well marked. Though the farmer still remains attached to his old home for feeding, storing grains and carrying on socio-economic activities but days are not far off when owing to the mounting pressure of population and

consequent lack of space for house construction, he will permanently move to his farm house.

Since the distance between the farm and the inhabited site determines the operational cost of the fields and socio-economic development of the villages, various methods have been suggested by the scholars to calculate village-farm distance. One of such schemes is based on the following assumptions.

- i) that the size of all the villages in a block is equal,
- ii) that entire population of the village lives in a single inhabited area, situated in the centre of the village,
- iii) the village land has a circular or hexagonal shape,
- iv) that the villagers have all their plots within the territorial limit of the village, and
- v) that every plot of a village is accessible in a crow flight fashion.

Using following formula* the average village farm

$$* \quad Vf = 0.5373 \sqrt{A/N}$$

where, Vf indicates the average village farm distance,
 A indicates the areal Unit, and
 N indicates the number of villages.

Table 5.I
VILLAGE-FARM DISTANCE

Block	Area km ²	Number of villages	V (km) 0.5373 $\sqrt{\frac{A}{N}}$	V metres
Kaimganj	366	177	0.773	772.6
Nawabganj	231	90	0.861	860.8
Shamsabad	348	175	0.758	757.7
Rajepur	342	166	0.771	771.2
Barhpur	159	102	0.671	670.8
Mohammadabad	413	122	0.989	988.6
Kamalganj	331	185	0.719	718.7
Chhibramau	324	132	0.842	841.8
Talgram	287	103	0.897	896.9
Saurikh	262	96	0.888	887.6
Haseran	212	57	1.036	1036.2
Jalalabad	212	93	0.811	811.2
Kannauj	288	165	0.708	707.7
Umarda	536	108	1.197	1196.9
District Farrukhabad	4311	1771	0.838	838.3

distance in Farrukhabad district comes to about 838.3 metres, varying from 670.8 metres in Barhpur block to 1196.9 metres in Umardg (Table 5.I and Fig. 5.2A). Based on these V_f values the region may be classified under following sub categories:

1. Very Low Distance (< 700 metres) :

Only Barhpur block falls in this category where V_f distance falls down to 670.8 metres. The block has 102 villages, spreading over 159 km^2 area. It has the highest density of population and villages (64 villages per 100 km^2 of area) and lowest spacing (1.34 km.) owing to its proximity to the district headquarters and fertile lands of the Ganga Khadar, which play significant role in reducing the V_f distance.

2. Low Distance (700-800 metres) :

Five blocks namely, Kannauj (707.7 m), Kamalganj (718.7 m), Shamsabad (757.7m), Rajepur (771.2 m) and Kaimganj (772.6 m), fall in this category. Housing 868 villages in a total area of 1675 km^2 (village density varying from 57 to 48 villages per 100 km^2 and village spacing from 1.42 km. to 1.57 km.), all these blocks lie along the bank of the Ganga where apart from its fertile soil the well developed means of transport and communication have led to the vigorous growth of settlements

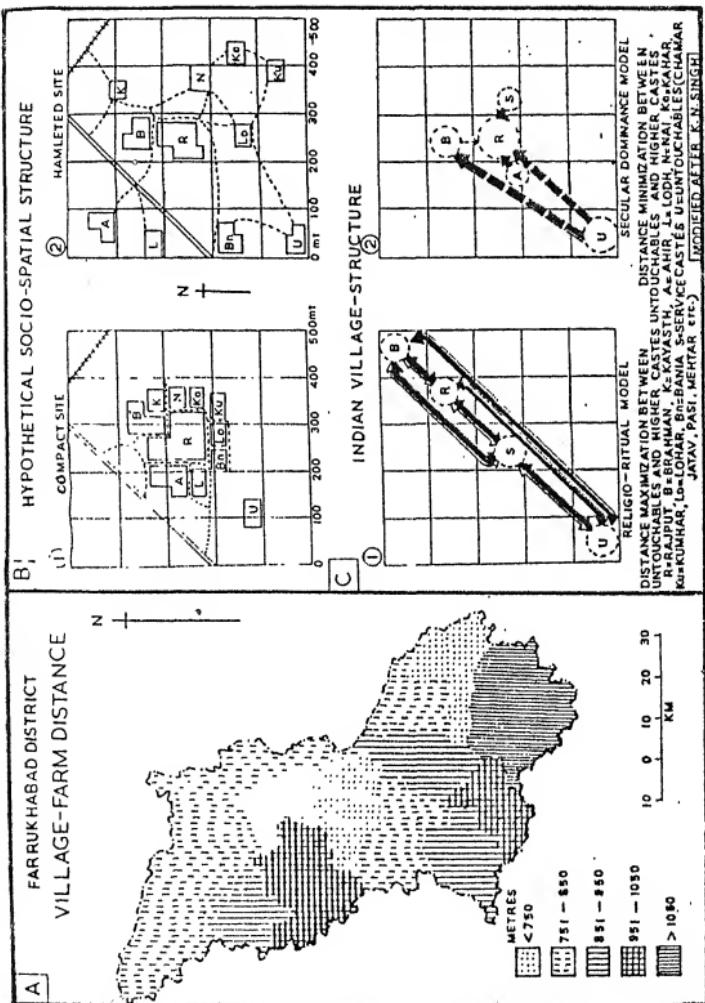


FIG. 5-2

and consequent lowering of the village-farm distance.

3. Medium Distance (800-900 metres) :

This category includes five development blocks, namely Jalalabad (811.2 m), Chhibrampur (841.8 m), Nawabganj (860.8), Saurikh (887.6 m) and Talgram (896.9 m). This area is traversed by G.T. road and a number of new roads, which have played a significant role in the development of settlements. The region houses 514 villages in an area of 1316 km.², giving a moderate village density (36-44 villages per 100 km.²) and spacing (1.62 km. to 1.79 km.). Many of these occupy old sites developed during medieval times, along the caravan routes and old seats of administration.

4. High Distance (900-1000 metres) :

Only one block Mohammadabad (988.6), falls in this group which houses 122 villages in an area of 413 km.² giving low village density (29 villages/100 km.²) and high spacing (1.98 km.). Here the sandy nature of soil and lack of irrigation facilities have given rise to low density of population and villages leading to high Vf values.

5. Very High Distance (> 1000 metres) :

A total number of 273 villages, spreading over 824 km.² of area in two southern blocks of the region, Haseran and Umarda, fall under this category (Table 5.I). The region is characterised by low village density (20-27

villages/100 km.²) and high spacing (2.07-2.39 km). Here the lack of transport facilities, infertile soil and defective drainage lead to low village density and consequent high value of Vf distance.

Since above figures fail to give the correct picture of the actual village-farm distance owing to different shape and size of the village lands and the location of residential sites therein, the author has selected six sample villages, from different parts of the study area to measure the village-farm distances using only the last assumption, i.e., crow-flight accessibility (vide Table 5.II).

TABLE 5.II
Village Farm Distance in some
Sample Villages

Sl. No.	Villages	Distance in Metres	
		Longest	Average
1.	Aligarh	603.5	377.2
2.	Gangloo Paramnagar	1181.9	741.8
3.	Khanpur	779.5	572.1
4.	Nekpur (Kayasth)	603.5	339.5
5.	Sarai Daulat	1207.0	548.2
6.	Turkpur	427.5	352.0

The village Gangloo Paramnagar, in Shamsabad block, has two inhabited sites - Ganglao and Paramnagar (Fig 5.3A). The former is the main and older site, situated in the centre of the village while the latter exists in extreme north, along the border of the village. The average village-farm distance is calculated as 741.8 metres while the far most fields in the north lie at a distance of 1181.9 metres away from the main village, Ganglao. But same are within stone throwing distance from Paramnagar hamlet. The village Khampur, in Barkpur block, has a rectangular shape (Fig. 5.4A) and except some emerging hamlets the majority of people live in a single inhabited area, in the east central part of the village. There is not much difference between average (572.1 metres) and the longest Vf distances (779.5 metres) due to rectangular shape of the village and central location of the inhabited site. The village Sarai Daulat, in Talgram block, has an east-west elongated shape (Fig. 5.4B). The settled area is located along the G.T.road, in northern part of the village, which falls far away from the cultivated fields in the south-east or south-west. The longest Vf distance has been measured as 1207 metres against an average distance of 548.2 metres only.

Table 5.II clearly indicates that village-farm distance varies from village to village. Such villages

which have irregular shape, large size and several built-up sites exhibit greater anomalies in V_f values. Such variations are well marked on world-wide scale, e.g. Finland 1-11 km., China 0.6 km. (Duck, 1937, p.183) Belgium, Holland and Switzerland 0.3-1 km. (Dovring, 1965, p.41). Khan, in his study of West Punjab (Pakistan) holdings, has observed that the operational cost of holdings for every 500 m. of distance from the buildup area would increase by 5.3% for ploughing, 20-25% for manures and fertilisers and 15-32% for transporting crops (Khan, 1955, p.8). Hence efforts should be made under the consolidation scheme to allot plots, as far as practicable, nearer to the residential sites or farmers should be encouraged to build new farm-houses in their respective plots to save additional cost of transporting cattle, farm implements, manures, seeds and crops to and from fields.

(b) Field Sizes and Patterns :

Field sizes and patterns are very important in rural settlement studies, because these not only throw light on current land use practices, cropping pattern, land tenure, soil fertility, soil types, population pressure, climate and physiographic conditions but may help in reconstructing the whole settlement history of the region (Tiwari, 1984, p.95). In the study area the evolution of the present field patterns and field sizes dates back to

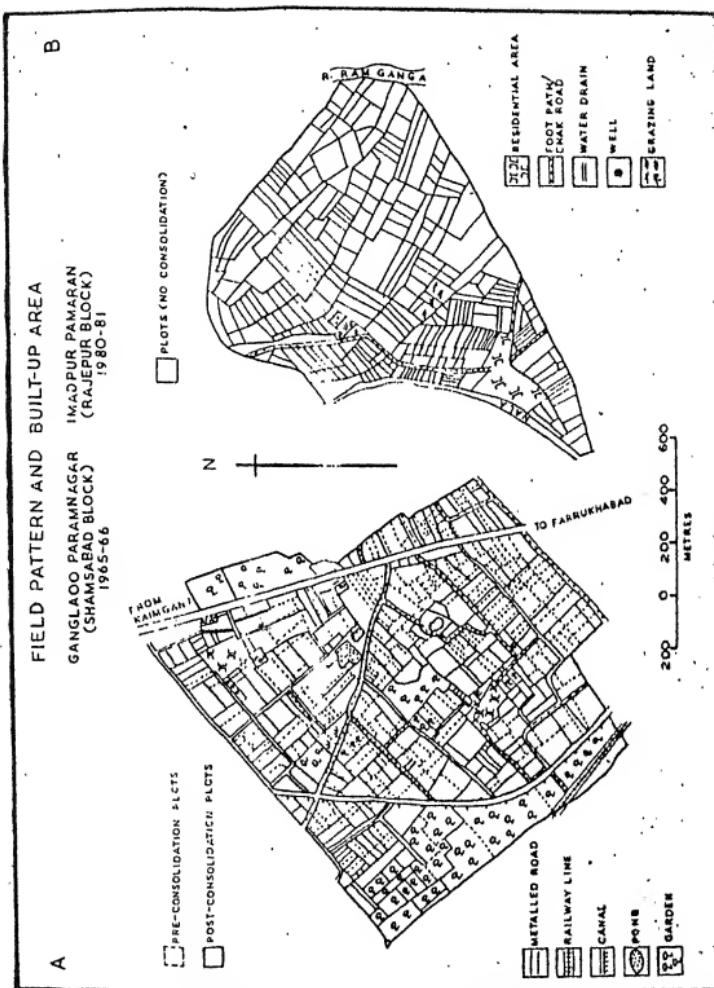
Medieval period when Rajput settlers colonised the region after clearing the forest tracts and distributing plots to each family on the basis of individual contribution. Men in power and nearer to the clan chief occupied larger plots and fertile lands near the built up site, while others were allotted small infertile tracts on the periphery of the village. This malpractice continued in Rajput and Muslim period when the caste and the loyalty to the ruler were the main criteria for the possession of lands. Britishers also selected loyal and upper class people as 'zamindars' and made them owner of the land, on the contract of a regular payment of land revenue. After independence, the 'zamindari' was abolished making the tenants sole owners of the land. Still higher castes retain bigger size of good lands while low castes are deprived of such benefits.

In the beginning, the fields were comparatively bigger and of squared shape, which later on changed into rectangular and small sizes due to growth of population and division of family property. Even the consolidation scheme has not been able to yield much benefit owing to the farmers' choice for retaining plots in all types of lands (Gauhan/manjha/multi cropped/single cropped, irrigated/dry, rabi/Kharif etc) so as to grow all types of crops and also to ensure some crop production during

bad weather. A report from Turkpur village indicates that there were only 72 field plots in 1900 which increased to 106 in 1956 due to increase of population and division of family property. Similarly Khampur village had 435 field plots in 1941 which were reduced to 310 by 1962 after consolidation. In order to restrict the divisions of the 'Chaks' arrangement have been made under new consolidation scheme to constitute big plots of 20 to 25 acres and allot individual 'Chaks' therein. A farmer has now been restricted to sell or transfer any part of his 'chak' so as to avoid fragmentation of field plots. But the law still has numerous loopholes whereby fragmentation of 'Chaks' is still going on unchecked.

Figures 5.3 A & B show the field pattern in two villages of study area. Imadpur Panbaran (1981, pp.571), a village along the Ramganga river in Rajepur block, has not yet been brought under the consolidation scheme. The field plots of the village have irregular shapes, though majority of them have strip pattern due to the impact of the river environs. Such narrow plots running several metres perpendicular to the river bank are the typical features of the Ganga Khadar lands.

The village Ganglao Paramnagar (1981, p.687) in Shamsabad block, is situated along Kaimganj-Farrukhabad



road. Its double inhabited area, presence of railway line and Farrukhabad branch of Lower Ganga Canal have profound impact in affecting the pattern of the field plots. Prior to consolidation the fields (442) were smaller in size and long strip type, but consolidation has converted them into (227) 'Chaks' of mostly rectangular shape. Fields are comparatively smaller in size near the inhabited site where the soil is more fertile. The 'Chaks' have been so arranged that every field should get the canal water for irrigation. The large 'Chaks' are mostly gardens belonging to the erstwhile family of Nawabs of Shamsabad. Similarly pasture lands are situated near the Ahir dominated (over 90%) site of the village.

(c) Land Ownership and Landuse Patterns :

Landownership is an yardstick to assess economic and social status of a person in rural areas. It also determines the size of the land, holdings, field patterns, crop land use and cropping intensity in a village. Samples studies have shown that high castes like Rajputs, Brahmans, Kayasths, Saiyeds and Pathans, most of whom have been descendants of old 'zamindars' and 'taluqdars', have a lion's share over the village land. Their field plots are bigger in size and they occupy the best crop land of the village. Middle castes like Ahirs, Bachhis, Kurmis, Lodhs, Kisans etc. are gradually increasing their land holdings due to

their toil and strenuous labour and extravagant habits of high castes in recent years. Low castes like Chamars, Pasis, Dhanuks, Banjaras, etc., are mostly landless labourers and own a very negligible portion of village land.

(i) Khanpur Village :

Village Khanpur (1981 pop: 1801), in Barhpur block (Fig. 5.4A), was formerly under the 'zamindari' possession of Nawab of Shamsabad. Early Rajput settlers defied the payment of revenue to the Nawab and hence were forced to leave the village by the help of a Katiyar family from Barhpur. The village was given as a gift to this Katiyar family, which still owns 50% of the village land. Katiyar also brought service ~~castes~~ like Kachhi, Kisan, Dhanuk, Dhobi, Teli, Nai and Barhai etc., to carry on different services under 'Jajmani' system.

Table 5.III shows the distribution of different castes and land ownership in the village. It is surprising that Katiyars covering only 18.4% of the village population occupy 50.2% of its cropped land. On the contrary Dhanuks with 11.6% of village population are landless labourers. The position of Chamars, the highest ranking caste in population (22.8%) is no less better who own only 2.2% of the agricultural land. There are only two other castes -

Table 5.III
LAND OWNERSHIP BY CASTES : VILLAGE KHANPUR, 1985

Castes	No. of families	Total population 1985	% of population	Land ownership (Acres)	% of land owned	Per capita land	Per acre population pressure
Chamar	55	433	22.8	4.7	2.2	0.01	92.1
Kachhi	37	384	20.2	45.7	21.0	0.12	8.40
Katiyar	35	356	18.7	109.6	50.2	0.31	3.25
Dhamuk	24	220	11.6	—	—	—	—
Kisan	22	176	9.2	30.6	14.1	0.17	5.75
Dhobi	9	88	4.6	0.1	0.04	0.001	860.00
Mehtar	8	83	4.4	0.4	0.2	0.005	207.5
Teli	6	81	4.3	2.0	0.9	0.025	40.5
Nai	4	30	1.6	1.3	0.6	0.043	23.07
Barhai	4	22	1.2	2.1	0.9	0.095	10.48
Muslims	3	26	1.4	2.8	1.3	0.108	9.29
From other villages	—	—	—	18.7	8.6	—	—
Total	207	1899	100	218.0	100	0.115	8.711

Kachhi (20.2%) and Kisan (9.2%) who hold a reasonable part of cultivated land (Kachhis 21% and Kisans 14.1%). Other service castes like Dhobi, Mehtar, Teli, Nai and Barhai etc, own less than one percent of agricultural land in the village. On the contrary some Brahman, Rajput and Bania families from neighbouring villages still retain 8.6% of the village land.. Though per capita share of land is maximum in case of Katiyars (0.31 acres), followed by Kisan(0.17), Kachhis (0.12), Muslims (0.1) Barhai (0.095), etc., the per acre population pressure is acute in case of Dhobis (880), followed by Mehtar (207), Chamar (92), Teli (40) etc.

Figure 5.4A shows that the field plots of Katiyars are comparatively bigger in size with square or rectangular pattern. They occupy the most fertile soil and the use of private irrigation facilities (pumping sets etc.) have enabled them to cultivate as many as 3 crops in a year. The field plots of Kacchis are confined to northern part of the village (except some small fields in southern part). Though the credit of having the biggest plot goes to a Kisan family of the village but their plot sizes are comparatively smaller, scattered in west and south-western parts of the village.

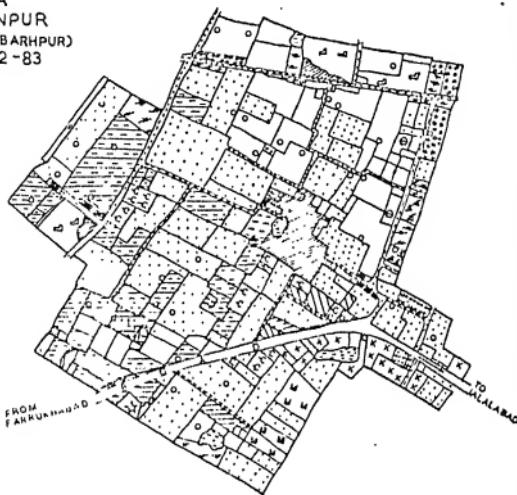
(ii) Sarai Daulat Village :

Sarai Daulat (1981 pop:1305), an inhabited

LAND OWNERSHIP BY CASTES

A
KHANPUR
(BLOCK BARHPUR)
1982-83

N



B
SARAI DAULAT
(BLOCK TALGRAM)
1980-81

Legend for Map B (Sarai Daulat, 1980-81):

- INHABITED AREA
- METALLED ROAD
- UNMETALLED CHAK ROAD
- FALLOW LAND
- BARREN LAND
- GRAVE YARD
- TEMPLE
- MOSQUE
- SCHOOL
- WELL
- POND
- MANURE PIT
- BRICK FACTORY
- BRICK CLIN
- COLD STORAGE

100 0 100 200 300 400 500
METRES

FIG. 5.4

site along the G.T.Road in Talgram block (Fig. 5.4B), also exhibits similar disparities in the distribution of village land. Kachhis (also called Kushwahas), the leading caste (48% population), hold 63% of the village agricultural land while Muslims (19% population), accounting next to them in population, possess only 3% of such land. Banias and Brahmans, who constitute 4% of the village population retain 10% of its agricultural land. Remaining castes like Kahar, Kumhar, Dhobi, Teli and Chamar etc., constituting over 28% of village population, collectively own only 16% land. Here per capita proportion of land is very small while per acre population pressure is acute. Most of them are landless agricultural labourers earning their livelihood by the paltry wages given to them in lieu of their hard work.

(d) Socio-Spatial Structure :

The study of the sample villages very well indicate that the internal structure of the builtup area is very much affected by the social conditions especially the caste system. Higher castes like Brahmans, Rajputs, Kayasths, Pathans, etc., who own major portion of the village land, generally occupy the best part of the inhabited site and live in large pretentious houses with big courtyard, wide verandahs, separate room for each young female, 'baithaka' for guests and cattlesheds, etc.

Middle castes like Ahirs, Lodhs, Kisans, Kuchhis, Bahars, Nais, etc. generally reside in medium sized dwellings near the high castes (Plate No.17). On the contrary untouchables, like Chamars, Dhanuks, Pasis, Mehtars, etc., live at some distance from the high castes in small one-room houses at times shared by the entire family and the cattle as well. In large villages caste-based hamlets emerge, e.g. Chamrauti, Ahiran, Pasiyan, etc. These three organs of village social system functioned as single unit under erstwhile 'jajmani' system. Though the links of this chain are gradually loosening in recent years due to spread of education and new socio-economic reforms, they still play a significant role in rural functional system and rural development. K.N.Singh (1972) has very well highlighted this functional inter-dependence of village communities through his . . religio-ritual and secular dominance models (Fig. 5.2C).

1. Religio-Ritual Model :

Hindu social structure, based on the caste system, helps in maximising social distance between touchables and the untouchables owing to socio-ritual notions like purity, pollution, untouchability, etc.

It forms a Brahman-untouchable continuum wherein other castes occupy different niches (Fig. 5.2 C1D depending upon their social status. This leads to the development

of twin settlements of caste Hindus and untouchables who are separated from each other more by social space than any physical space/barrier. Brahmins being the priestly caste and performers of rituals and ceremonies are found in almost every village and so is the case with the untouchables who supply bulk of the labour force to carry on agricultural activities. In early days Brahmins were given rent free land in the best part of the village while low castes like Chamars, Dhanuk, Pasis, etc., were kept on the periphery or in separate hamlets, outside the village (Fig. 5.2 B). A study of sample villages shows that such inhabited sites are invariably separated by village groves, fields, tanks etc. on the direction less conducive for wind movement, for even air gets polluted by coming in contact with shudra's body.

2. Secular Dominance Model:

In contrast to the religio-ritual model of distance maximization the secular dominance model brings the caste Hindus and untouchables closer to each other and compels them to function as complementary unit under old 'jajmani' system (Fig. 5.2C2). Landless for their agricultural work and low castes for earning their livelihood had to depend upon each other so as to reduce the social distance between each other. There are numerous examples where Rajputs, Brahmins and Muslim land lords

invited many low castes from neighbouring villages and granted them subsidies to settle in their respective village for providing various services to the land lord.

With the spread of education and new socio-economic reforms the age old notions are fast disappearing. While lower castes have been given government grants, loans, subsidies, etc. (Plate no. 22), to make themselves free from the clutches of the high castes and money lenders and also to stand on their own feet, the high castes, unable to pay the rising cost of human labour, are switching over to pumping sets, tractors, threshers and other labour-saving farm machineries. A new rivalry between different caste groups has started in which each caste is trying to complete other to acquire rightful place in the village's socio-economic hierarchy.

3. Case studies :

In the following lines an attempt has been made to throw ~~the~~ light on these aspects of rural social structure on the basis of sample study of selected villages:

(i) Bhatasa village (1981 pop: 2657) :

This multi-caste village, in Nawabganj block (Fig. 5.5), was occupied by the BHARS in ancient days. During the time of the King of Khor (about 800 years ago)

SOCIO-SPATIAL STRUCTURE BHATASA 1981 A.D.

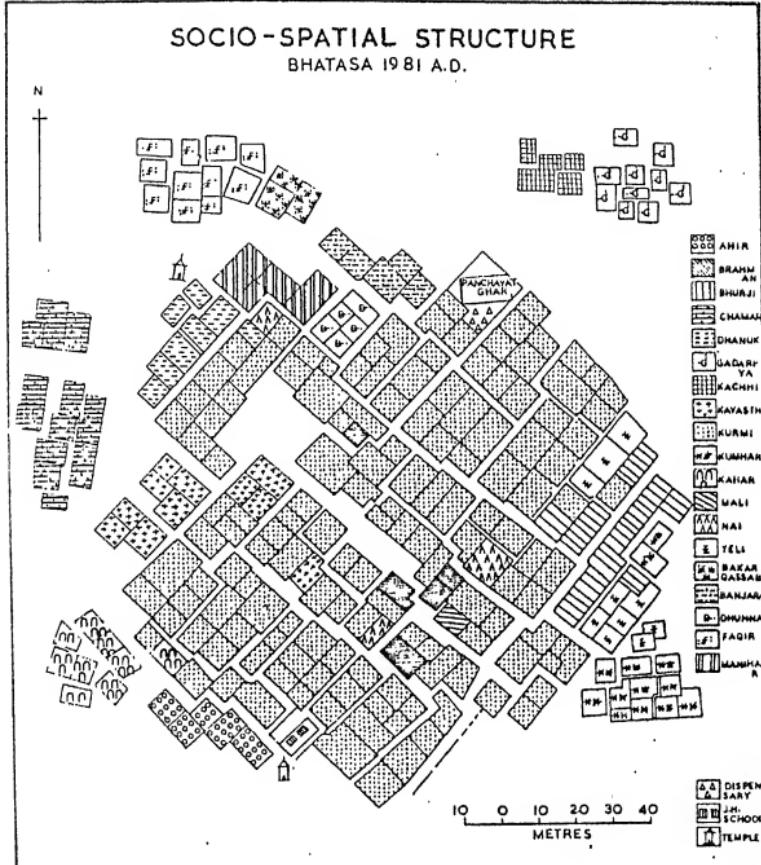


FIG. 5-5

when the Kurmis were troubled and massacred by Rajputs in Ganglai village (near Shamsabad) Dhan Kurmi took shelter at an uninhabited 'Kherha' before spreading over to two pieces of land called 'Chaurhaspar' and 'Mani Ramput'. Later on, during 'Shahi period', Harihar Das Kurmi got hold of the land and named it 'Abdul Wahid Pur'. In 1842 the village was divided into two parts known as Mohal Bhatasa Harlal and Mohal, Bhatasa Bhajan, comprising of $7\frac{1}{2}$ and $12\frac{1}{2}$ 'biswas' respectively. These two 'mohals' of Bhatasa are thickly populated and are under control of the descendants of two Kurmi brothers- Harhar Das and Narhar Das. Today Kurmi constitute 18.4% of the total population of the village (Table 5.IV) but own about 60% of its cultivated land. They also occupy the best residential site of the village and live in comparatively bigger houses. Other castes, which live near the Kurmi dwellings, include Kayasths (1.8%), Brahmans (2.2) and Nai (2.0), while Kahars (2.0), Kumhars (4.8), Bhurjis (8.8), Ahirs (3.4), Telis (3.3), Dhanuks (0.5), Malis (0.3), Kachhis (1.5), Chamars (16.9) and Muslims (7.3) live on the periphery or in isolated hamlets outside the main village. The barren land, at a distance of about 2 km. in north has been given to Gadariyas (9.4%) for building their settlements. All these castes acted as single functional unit under old

TABLE 5.IV
CASTE STRUCTURE IN VILLAGE BHATASA, 1986

Caste	No. of Families	Population	% of Population
Ahir	11	91	3.4
Barhai	6	45	1.7
Banjara	4	21	0.7
Bhurji	33	237	8.8
Brahman	11	59	2.2
Chamar	74	455	16.9
Chick	7	62	2.5
Darzi	1	16	0.6
Dhanuk	26	69	2.5
Dhobi	7	40	1.5
Faqir	7	50	1.8
Gadariya	32	253	9.4
Kachhi	8	39	1.5
Kahar	7	54	2.0
Kayasth	7	50	1.8
Kumhar	21	131	4.8
Kurmi	76	496	18.4
Mali	1	8	0.3
Manihar	13	111	4.1
Mehtar	6	19	0.7
Nahaf	23	207	7.7
Nai	10	54	2.0
Nat	3	21	0.7
Rajput	3	21	0.7
Teli	14	89	3.3
Total	411	2698	100.0

'jajmani' system, even though they remained socially segregated from each other. In beginning there was sufficient gap between main inhabited area, occupied by Upper castes and the houses of lower castes. But due to the growth of population this gap is now gradually shrinking. Inspite of this at no place the house of an upper class family has the common wall with that of a scheduled caste. These untouchables are still not allowed to sit on the cot at par with the upper class people. They are still dependent on big landowners for earning their livelihood and in the absence of self sufficiency and economic power they are yet to regain an honourable place in village social hierarchy.

(ii) Kabirpur village (1981 pop: 1948):

Kabirpur village was formerly the hamlet of Saurikh. The village was initially settled by the Muslims who were driven out by the local Rajputs during the late 13th century. They killed their chief Saiyed Khondu, and his wife Mrs. Zahoor-un-Nisa Begum fled away to her parents house at Aligarh. Her son Iad Mohammad*, aided by local Brahmins, regained the possession of Saurikh and 82 neighbouring villages.

* His period is confirmed by the 'Shajra', where in he was shown as the 20th descendent of the 10th Imam Ali Nagi (254 A.H.), after whom his descendants are called 'Naqvi'.

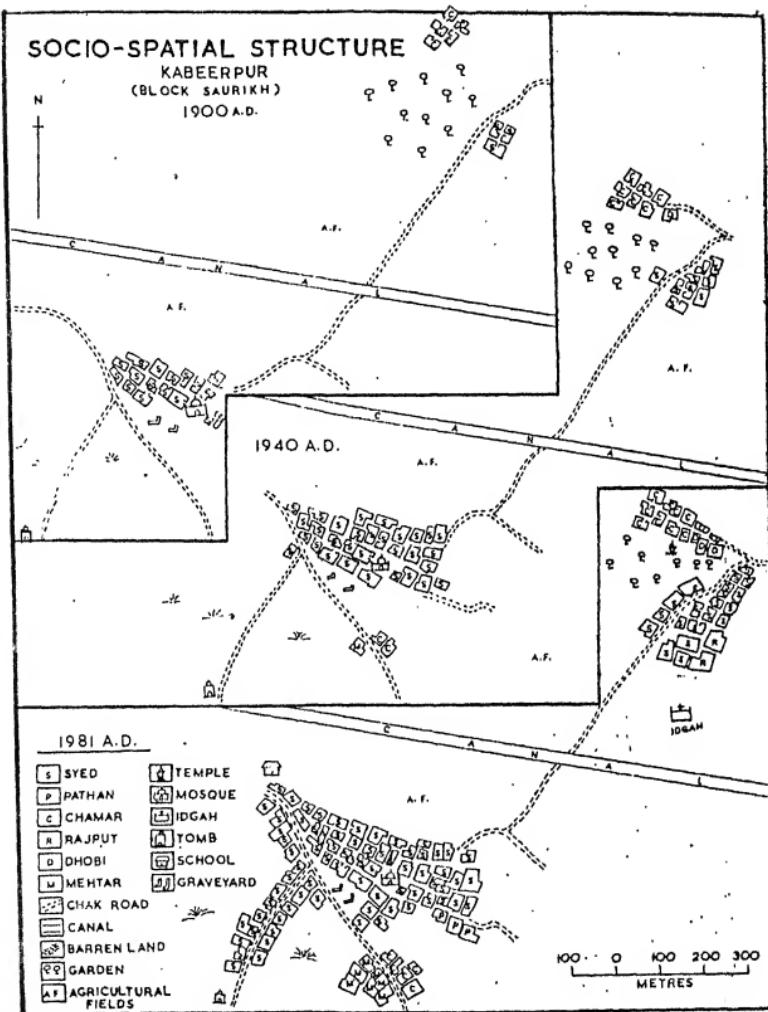


FIG-5-6

The government records mention that in the late 18th century one Saiyed Kabeer of Saurikh, who was the descendent of Saiyed Lad Mohammad, founded Kabeerpur. He invited Chamars from nearby village to work in the fields and settle at a distance of about 3 km. north of the main site in a separate hamlet. Later Saiyed Raz of Saurikh, another descendent of Saiyed Lad Mohammad, settled near the site occupied by the Chamars and named it Razpur (now Rajapur) which is now a hamlet of Kabeerpur (Fig. 5.6). During the course of time other service castes were also invited to settle in the village. Figure 5.6 clearly shows that there is still a wide gap between the settlements built by the land lords and the service castes specially untouchables like Chamar, Mehtar etc. Though the physical distance has been gradually narrowed down due to increase in population and consequent growth of new dwellings in recent years but the social segregation still persists in one form or other.

(iii) Sarai Sunder Village (1981 pop:484):

This Brahman dominated (68% of total pop) village, in Chibramau block, consists of two inhabited sites exhibiting a typical example of caste based spatial structure (Fig 5.7A). It is stated* that in early 14th century, a Rajput Beesgotri Raja Sumer Singh, who drove

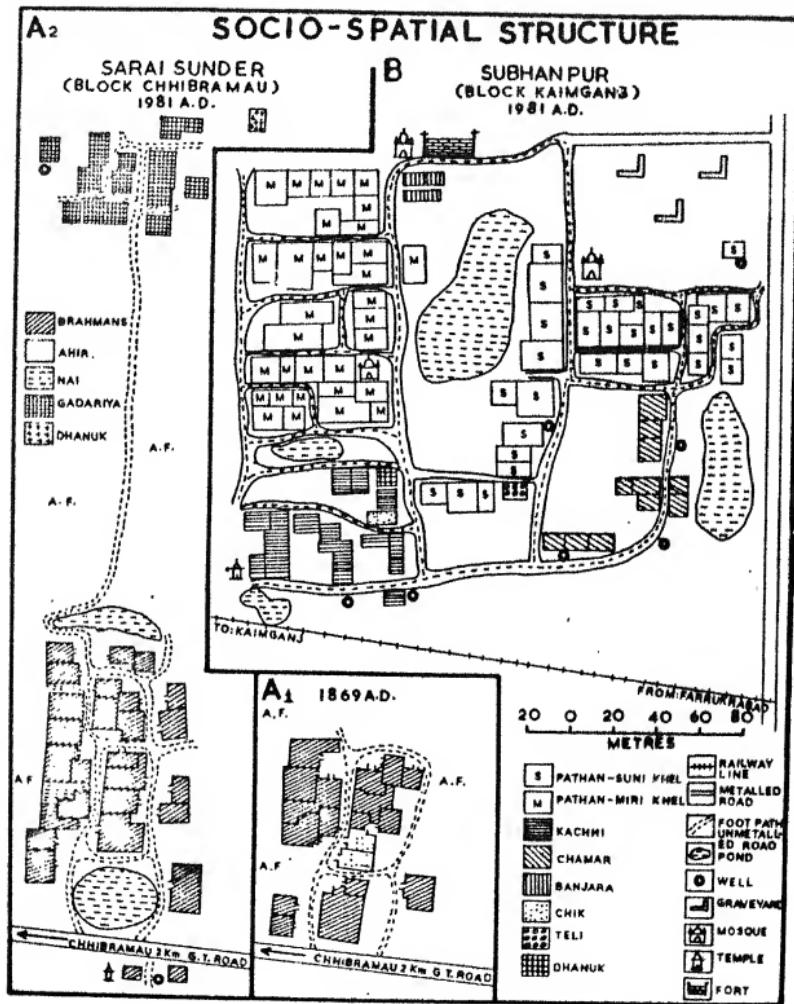


FIG. 5.7

out the 'zamindar' Rajputs of this village visited Singh Rampur to take holy bath in the Ganga. After performing the 'Shivagotra' he granted the village land to 175 Brahmins whose descendants, numbering 330, still occupy the main inhabited site of the village along the G.T. road.

Figure 5.7A shows that earlier there were two Ahir families residing near the Brahmins. But they migrated to Kannauj after selling their property to Brahmins. Now Brahmins control 98% of the village land leaving only 2% for a Nai family.

Some Gadariyas (Plate No.6) from the adjoining village were invited to settle in the late 19th century. But being a low caste they were not allowed to settle near the Brahman houses. They built their homes in Jaisi-Nagla, about 2 km. north of the main site. This direction was well chosen to avoid air pollution because wind rarely blows from the north in this area. Similar discrimination is also seen in Nai and Dhanuk settlements. Both of them migrated from Akbarpur in 1940 while Nai, being a touchable caste and coordinator of Brahmins in performing religious rituals, was allowed to settle in the main village, the latter had to go to Jaisi Nagla, situated in the north (Fig. 5.7 A2). Dhanuks, being the scheduled caste, made their house on the outer part of the Nagla and do not mix freely even with Gadariyas.

(iv) Subhan Pur village (1981 pop: 1186):

Village Subhanpur, in Kaimganj block, was formerly called as Bharatpur which was a hamlet of Jhabbupur. It was originally inhabited by Banias, Sonars, Kachhis, Telis and Chamars. It is said that about 250 years ago, one Subhan Khan of Suni Khel (Suni Tribe) migrated to India with his family from Tera in Afghanistan. He was permitted by Mohammad Khan Bangash, the Nawab of Farrukhabad, to build his colonies in this village which lie on the outskirts of Kaimganj town. This annoyed Thakur Jhabbu Singh, the 'zamindar' of the area. As a result of which initial colonies built by the new settlers were destroyed many times, in the nights. Once Pathans got hold of one person from the invading party and buried him alive in the wall. As a result of it hostility ceased and Pathans got full control of the village land. This part of the fort wall is still known as ghost corner and is worshipped by many people.

Another tribe of Pathans (Miri Khel) migrated to the village and settled in the west of the village pond (Fig. 5.7 B). They built their colonies at a reasonable distance from the early settlers as every Pathan tribe regards itself superior to other. In the meantime, unable to adjust in the changing culture, Banias and Sonars left the village to settle in Kaimganj town. But Kachhis,

Chamars and Telis, socially backward people, could not dare to leave the place. Three Teli families even accepted Islam religion. Dhanuks and Chiks came in later periods and settled near other Hindu castes while Nats preferred to occupy the vacant land lying between two Pathan tribal settlements.

5.2 SHAPE ANALYSIS :

The territorial limit of a village forms part of a 'Geographical space' or 'bounded Space' within which its inhabitants live and perform their various duties. The shape of this area very well affects the economic life, functional efficiency and transport cost of the villages. Various attempts have been made by the settlement geographers to study the form and structure of the village but the new quantitative techniques have provided them additional tools to measure it precisely and suggest the method of transformation for village shapes for balanced regional development. Here an attempt has been made to study the shapes of the villages in the study area, both by qualitative as well as quantitative methods for suggesting guide lines for shape transformation keeping in mind the development needs of the area.

5.2.1. Qualitative Approach :

The study of village shapes has not been new in the field of Geography. It began with Meitzen's classic work in 1895 which initiated the scientific analysis of village shapes in the field of settlement Geography. His ideas were followed by Hall (1931), Demangeon (1933) and several other scholars. In India Singh (1955) initiated such studies through his description of layout of the villages in Middle Ganga Valley. Since then many attempts have been made to study the layout and patterning of villages in different socio-economic environs. On the basis of these studies following broad patterns may be identified in the villages of the study area (Fig. 5.8):

(a) Rectangular or Square Pattern:

Rectangular or square pattern is very common in the villages of study area. It has closer affinity with the system of land measurement (Bigha system) which has direct bearing on field patterns, ploughing patterns, house design, etc. Here houses are arranged in two or more rows in north-south or east-west directions. Sometimes roads, railway lines or the river banks determine the outer boundary of such villages. Villages like Amritpur, Kumhraur (both in Rajepur block) Mundarwa (Umarda) Manjhana (Shamsabad) Saurikh and Jalalabad

RURAL SETTLEMENT PATTERNS

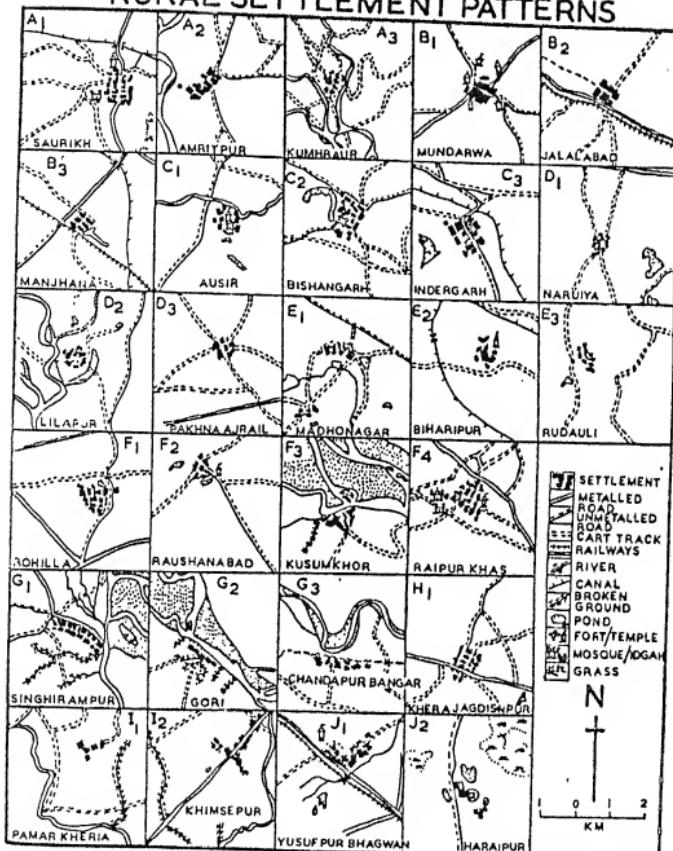


FIG.5-8

exemplify this pattern (Fig 5.8 A1 to B3).

(b) Hollow Rectangular Pattern :

Such type of pattern develops around a pond, hillock, temple, mosque, fort and ruined site etc. Ausir (Umarda), Bishangarh and Jhundergarh (both in Chhibranau) villages illustrate this example (Fig. 5.8 C1 to C3).

(c) Circular Pattern :

Circular pattern is generally seen in case of ancient villages in which houses are located around the fort of local chief or 'zamindar' and are protected by walls all-around. In some cases natural barriers like rivers, marshes, lakes, ponds etc. also cause such circularity. Examples are Naruiya (Talgram), Lilapur (Rajepur) and Pakhna Agarail (Mohammedabad) villages (Fig. 5.8 D1-D3).

(d) Semi-circular Pattern :

Semi-circular or crescent shaped villages are developed along the river meander, lake or pond. Examples are Madhonagar (Talgram), Biharipur (Haseran) and Rudauli (Jalalabad) villages in the study area (Fig. 5.8E to E3).

(e) Triangular Pattern :

Sometimes topographical barriers like river, marsh,

hillock, pond etc. force the villages to assume the shape of a triangle or hollow triangle. In the study area villages like Rohilla (Mohammadabad), Roshanabad (Shamsabad), Kusumkhor (Jalalabad) and Raipur Khas (Kaimganj) clearly exhibit this pattern (Fig. 5.8 F1 to F4).

(f) Linear Pattern:

Such settlements develop in a straight line along the road side, river bank or lake shore. Gori, Chandapur Bangar (both in Jalalabad) and Singh Ranipur (Kamalganj) villages may be cited as typical examples (Fig. 5.8 G1 to G3).

(g) 'L' or 'T' shaped Pattern :

When two rectangular blocks of houses meet each other at right angles, 'L' shaped villages are formed (Singh and Singh, 1976 p.35). Further extension of residential site yields 'T' shaped villages. The villages like Yusufpur Bhagwan (Kannauj) and Haraipur (Umaria) illustrate the 'L' shaped pattern (Fig. 5.8 J1, J2) while Pamar Kheria and Khimsepur (both in Mohammadabad) present the 'T' shaped pattern (Fig. 5.8 I1, I2).

(h) Chessboard Pattern :

The right angled intersection of two or more roads

near the village centre and the main street generates this pattern. In study area Khera Jagdishpur (Chhibrampur) village presents the typical example of this pattern (Fig. 5.8 H).

5.2.2. Quantitative Approach :

The quantitative approach of shape analysis is based on the 'elementary packing theory' which analyses the village shape in respect of the 'efficiency of movement (the distance from the centre to outlying parts) and efficiency of boundaries (the length of its perimeter)' (Haggett, 1965, p.48). In this connection circle is the most suitable geometrical figure owing to its maximum packing capacity, more compactness and better accessibility. But packing an area into circles either leaves unserved gaps or tends to overlap each other. Hence, three alternatives may be proposed : triangles, squares and hexagons. Of these hexagon is much preferred because it retains much of the characteristics of a circle in terms of minimization of distance and movement without leaving unserved gaps.

(a) Measurement of Shape :

Though the scholars like Christaller and Losch have studied the hexagonal pattern of service centres but

the credit of introducing the idea of shape analysis goes to Thompson (1917). His idea was adopted by Miller (1953) in case of drainage basins. Haggett (1965, pp.51-52) used this method in the shape analysis of Brazilian countries while Rasheed (1972) used it in case of Bangladesh districts. Similarly Simmon (1962), Boyce and Clark (1964) analysed the shape characteristics of urban areas within the frame of circular geometry, while Wilkins and Shaw (1971) studied the measurement of shape distortion.

In the present study the shape indices of 300 sample villages have been calculated on the basis of Miller's formula as used by Haggett (1965). According to it the shape index (S) of a village may be noted as the ratio of the area of the village (A) to the area of the circle with the longest axis (L) as a perimeter (πR^2), so that $S = A/\pi R^2$ or $1.27 A/L^2$. In order to represent the shape ratio in percentage of a circle a multiplier of 100 may be added. Similarly the constant of 1.27 is so adjusted that the circle would have an index of unity, while 0.0 would be representing the elongated shape. The S_c values for the three theoretical lattices are 0.55 for triangular, 0.64 for square and 0.83 for hexagonal shapes (Bootes, 1978, pp. 87-88).

The computed values of the shape index, shown in the histogram (Fig. 5.9A), reveal that majority of the

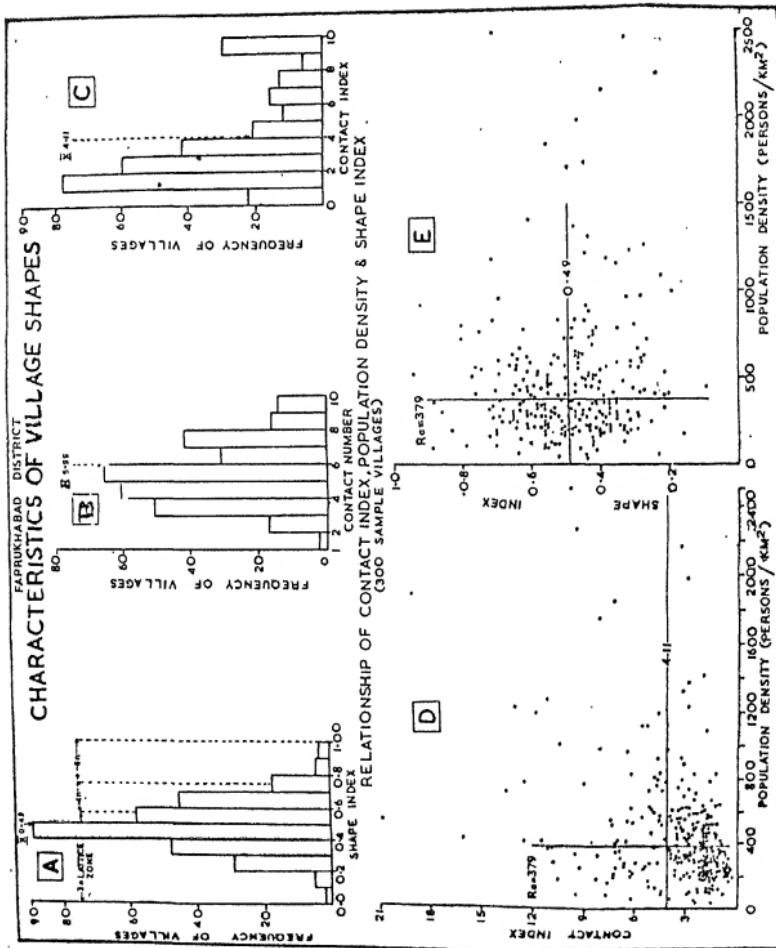


FIG-5-9

villages (240/300) fall between the shape index of 0.3 to 0.7 ($\bar{X} = 0.49$). This is due to the rectangular system of land measurement (bigha system) prevalent during ancient times. Only two villages, i.e. Katri Bhatpura (Kamalganj) and Pratappur (Jalalabad) have very elongated shapes (0.1) while three villages, i.e., Barnala (Shamsabad), Katri Neebalpur (Barhpur) and Aati (Kannauj) exhibit nearly circular shape. The frequency of villages in different shape categories (Table 5.V) has been plotted in figure 5.9A which also demonstrates the sequence of triangular, square and hexagonal lattices. There is a general trend from elongation to square without any break in higher shape categories as observed by any break in higher shape categories as observed by Haggett during the study of the Brazilian counties (Haggett, 1965, p.51).

The second characteristics of the shape analysis is the number of contacts between a village and its neighbouring villages. The mean contact number in the area is 5.99 which is very near to 6 as observed in case of ideal hexagonal system. A look at table 5.V and figure 5.9B shows a large number of villages (178/300) have the contact number between 4 and 6 which clearly indicates the square or near hexagonal pattern of the villages in the region. Similarly majority of the villages (200 out

Table 5.V
SHAPE CHARACTERISTICS OF 300 SAMPLE VILLAGES

Group	SHAPE INDEX F	%	CONTACT INDEX			Group	CONTACT NUMBER F.	%
			Group	F	%			
0.0 - 0.10	2	0.66	≤ 1	22	7.3	≤ 2	2	~
0.11- 0.20	5	1.66	1-2	78	26	3	17	~
0.21- 0.30	29	9.66	2-3	60	20	4	51	17
0.31-0.40	48	16.00	3-4	42	14	5	61	20.3
0.41 - 0.50	89	29.66	4-5	21	7	6	66	22
0.51 - 0.60	58	19.33	5-6	12	4	7	31	10.3
0.61 - 0.70	45	15.00	6-7	16	5.3	8	42	14
0.71 - 0.80	17	5.66	7-8	13	4.3	9	16	5.3
0.81 - 0.90	4	1.33	8-9	6	2	10	14	4.7
0.91 - 1.00	3	1.00	> 9	30	10	>10		
Σ	300	100	Σ	300	100	Σ	300	100
Χ	0.49		Χ	4.11		Χ	5.99	

of 300) have contact index values ranging between 1 and 5 (Table 5.V and Figure 5.9C).

The relationship between contact index (contact number/village area) and population density (Fig. 5.9D) and shape index and population density (Fig. 5.9E) does not show any significant correlation due to homogeneous nature of the region. However, the ancient villages have generally circular shape while villages affected by annual floods are marked by elongated shapes.

(b) Transformation of village shapes :

The concept of transformation of village shapes is based on the main objectives of minimising the transport cost and thereby evolving an effective settlement and marketing system for balanced rural development. Two geometrical figures (1. serial polygons, and 2. hexagons) may be used for this purpose. These serial polygons are also called 'Dirichlet polygons' after the name of the German mathematician, D.L. Dirichlet (1850), who was the first to use them. These are also known as 'Thiessen polygons' (1911) in meteorology, 'mosaics' in ecology and 'cellular net' (Getis and Boates, 1978) in geography.

In order to construct such polygons, diagonals are drawn between village centres and perpendicular bisectors

TRANSFORMATION OF VILLAGE SHAPES INTO HEXAGONS &
POLYGONS

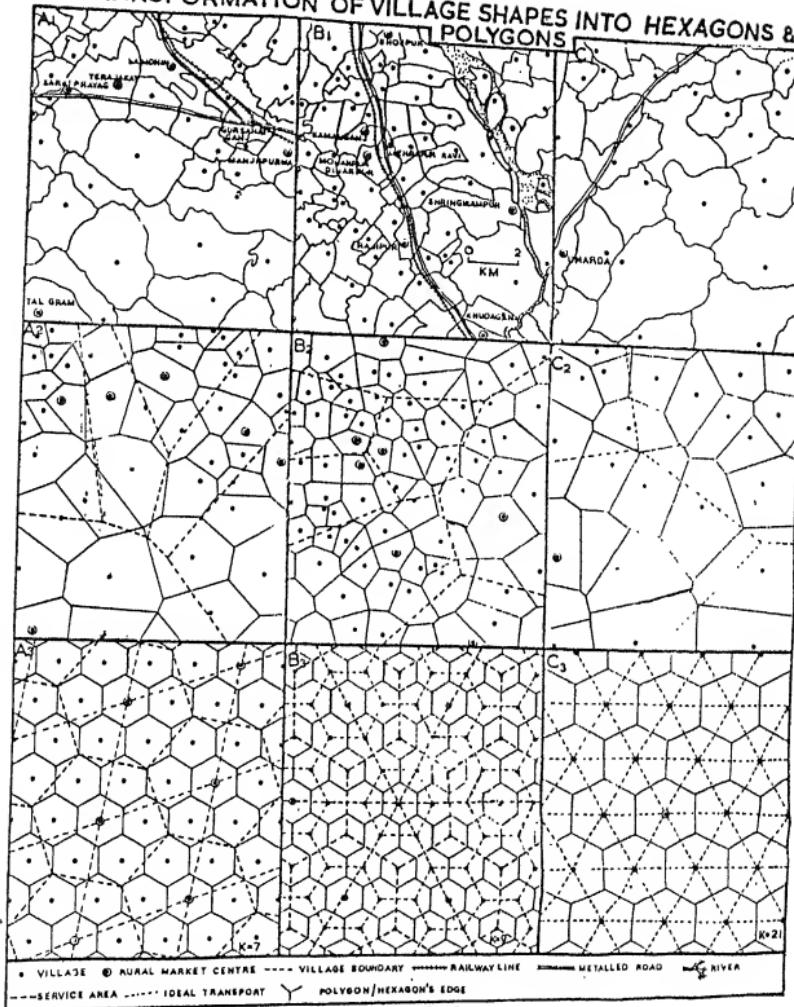


FIG. 5-10

are erected to form a net work of such polygons (Kopac, 1963, p.24). The main advantages of this method are that the area within the polygon boundary lies nearer to the enclosed village centre and no change in existing inhabited site is necessary to have effective control over the village territories (Fig. 5.10A2, B2 and C2). Similarly hexagons used by W.Christaller (1933) in his classical central place theory (Baskin, 1966 and Beaven, 1975) is based on the concept of uniform space. These do not only contain maximum village territory within their boundary but minimise the cost of transport, powerlines and canal development.

Taking these objectives in mind three sample areas (Fig. 5.10 A1, B1, C1) from different ecological settings of the region have been selected for case study. Each of these sample areas covers a total area of 129.4 km^2 and houses varying number of villages and market centres (Table 5.VI).

(c) Spatial characteristics :

Spatial characteristics of these three sample areas have been analysed through the nearest neighbour analysis in which it has been assumed that points are distributed according to Poisson Probability law. The random index ($R_N = 2 \gamma A / d$), fluctuating between 1.42

TABLE 5.VI
DISPERSION AND SPATIAL CHARACTERISTICS

SPATIAL ATTRIBUTES	SAMPLE AREAS		
	A	E	C
$\leq C$	43	69	23
$\leq m$	6	7	1
K value	7	9	21
HSC (Km)	1.864	1.472	2.549
HSm (Km)	4.951	4.620	12.224
rAc (Km)	1.234	0.970	1.835
rAm (Km)	3.257	2.974	7.539
rEc (Km)	0.868	0.685	1.139
rEm (Km)	2.321	2.150	5.698
RNC	1.422	1.416	1.548
RNm	1.403	1.383	1.341
Dic	0.662	0.659	0.720
Dim ²	0.653	0.643	0.623
dc/ km^2	0.332	0.533	0.176
dim/ km	0.046	0.054	0.068
Vc	0.206	0.128	0.364
Vm	1.472	1.263	0.871

C = centre, m = market, H_s = hypothetical spacing, rA = observed intra-centre distance, RN = index of dispersion, Di = index of random distances, d = density, v = variance.

and 1.55 for villages and 1.34 and 1.4 for market centres (Table 5.VI), show a clear trend towards regularity. The index of random disturbances ($D_i = rA/(1.075/ \quad)$) ranging between 0.66 and 0.72 for villages and 0.62 and 0.65 for market centres also indicate similar trend. The variable trends in respect of hypothetical spacing (HS), intra-centre distances (rA) and variances (V), may be ascribed to econo-socio-cultural factors prevailing in the areas.

On the basis of these spatial characteristics an ideal size of hexagon⁴ with different K values, has been proposed for each of the sample area (Fig. 5.10 A3, B3 and C3) which may be utilised in rural planning for balanced regional development.

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CHAPTER 6
RURAL DWELLINGS

The term 'dwelling' has a wide connotation including within its purview not only residential houses of all kinds " (from the humblest huts of poor to the most elaborate and massive city mansions), but all other human structures as well where people congregate or where their goods are stored" (Finch and Trewartha, 1946, p. 553). A house is an important feature of cultural landscape and is the best manifestation of man's adaptation to physico-cultural environment. Being the 'core of settlement geography' it may be used as an yardstick to measure the socio-economic conditions of its inhabitants, their functional requirements and cultural progress. Also its study may prove to be helpful in understanding the nature and dimensions of housing problems, rural sanitation and rural health, etc. In this chapter an attempt has been made to study the distribution, essential features and types of rural dwellings in Farrukhabad district which could throw sufficient light on existing rural housing conditions and their related problems.

6.1. EVOLUTION OF RURAL DWELLINGS :

The rural dwellings, in the study region, are well adapted to the physico-cultural environs of the region. Their evolution dates back to the early stages ^{of} human (1.

civilization when taking idea from shady trees like banyan, etc. primitive man built his impoverished hut in the forests to protect himself from the scorching heat, bracing cold and torrential rains. Materials used in such construction were collected from nearby jungles which included tree branches, tree leaves, bamboos, reeds etc. Since then with the advancement of technology there has been gradual refinement in the art of house building. During the Dravidian period" house roofs were formed by placing reed matting on beams and covering them with mud, while walls were made of sun dried or burnt bricks" (Majumdar, 1977, p. 21 and Mahajan, 1978, p.42). Vedic Aryans built their cottages (with circular walls) of wood, bamboos, flexible twigs, grasses and tree leaves, etc. (Mahajan, 1978, p.88). In due course of time these huts took an oval, rectangular or square form and their groupings in threes or fours around a rectangular or squared space (Brown, 1965, p.3) gave birth to a rudimentary form of courtyard which was initially used for enclosing cattle during nights.

The remains of the ancient cities of Kampil, Sankisa and Kannauj well illustrate the art of architecture prevalent in the region during the Buddhist and Hindu periods. It reached its zenith during the days of Harsha Vardhan when the imperial city of Kannauj was unsurpassed in its beauty and grandeur. When Mahmud invaded Kannauj in 1018 AD. he

was overawed by looking at the palatial buildings in Kannauj city. During the ascentancy of aboriginal culture of Meos and Bhars in the interior parts of the region a change was witnessed in the dwelling pattern. They built their houses made of wood and thatched with leaves and grasses (a remnant of primitive culture) but strong fortresses made of bricks were also constructed for Tribal Chiefs and Kings. Rajput settlers destroyed these dwellings and built new houses made of mud and sun dried bricks.

The area saw a new phase in the art of building construction with the incoming of Muslims, who brought Persian art and culture. Consequently a combination of Indo-Persian architecture is seen in the buildings constructed during the Muslim time. Britishers introduced the use of cement, concrete and iron bars which could not gain much popularity in the villages due to its high cost of construction. That is why majority of the rural houses are still constructed by mud, wood, bamboo, reeds etc. But with the rising standard of living of the people, scarcity of traditional house building materials, high maintenance cost of mud/thatched houses and their less durability, the rural folk are also going for the construction of pucca houses using burnt bricks, cement

and iron bars etc. But landless poor farmers still reside in one or two room thatched houses accomodating not only the entire family but cattle also (Plate No.16).

6.2. DISTRIBUTION :

There are altogether 2,60,043 rural houses in the region giving an average density of 60 houses per km.² (Fig 6.1B). Table 6.I shows that Rajepur block has the lowest density of rural houses (50 houses/km.²) while Barhpur records the highest concentration (61 houses/km.²). Based on distributional pattern four distinct density categories may be identified in rural houses :

The lowest house density (50-56 houses/km²) is found in six blocks of the region (Rajepur 50, Umarda and Haseran 52, each, Shamsabad 53, Kaimganj'55 and Saurikh 56) which are mainly confined to the flood prone or water logged areas of the north and south and are poorly served by the means of transport and communication lines. The second category of medium house density (63-68 houses/km²) includes five development blocks (Kannauj and Mohammadabad 63 each, Nawabganj 64, Chhibramau 66 and Talgram 68). These are located in the old inhabited areas and lie along ancient transport and trade routes. The third group of high density (72-73 houses/km.²) stretches over two development blocks (Jalalsabad 72 and Kamalganj 73) which

enjoy good transport facilities, proximity of urban areas and better agricultural harvests. The only block of Barhpur (81 houses per km.²) falls under the very high house density category owing to the availability of good fertile soil, less danger of floods, proximity of urban centres and good accessibility. The average number of houses per village in 165 (Table 6.I). It ranges widely, between to the size of villages in different blocks,

Table 6.I
DENSITY OF HOUSES

Blocks	Number of Houses		
	Per km ²	Per village	Per 100 house holds
Kaimganj	55	134	98
Nawabganj	64	168	99
Shamsabad	53	126	95
Rajepur	50	130	92
Barhpur	81	149	92
Mohammadabad	63	218	95
Kamalganj	73	151	94
Chhibramau	66	165	98
Talgram	68	196	88
Saurikh	56	155	90
Haseran	52	197	90
Jalalabad	72	195	94
Kannauj	63	136	93
Umarda	52	252	93
District			
Farrukhabad	60	165	93

SOURCE : Data from District Statistical Magazine, 1981.

6.3. ESSENTIAL FEATURES OF RURAL DWELLINGS :

Majority of the rural houses are built by using such local building materials which are available in plenty and at a cheaper rate. Though the size of the house varies from person to person depending upon the socio-economic status and functional needs of its user, certain essential features like courtyard, varandah, rectangular plan, etc., remain unchanged in each and every house.

6.3.1. Court-Yard :

After stepping into the inner part of the house one reaches a rectangular or squared open space called 'angan' or courtyard (Plate No. 18). It is surrounded by rooms on all four sides, or, on two or three sides by rooms and the remaining side by the wall with a gate. It occupies the central part of the house in which doors of the rooms open. "The courtyard represents the gradual evolution of the mode of grouping usually four huts round and open rectangular or square space during early settlements" (Singh 1957, p. 52). It serves the best purpose of maintaining family privacy and 'purdah' system amongst women and compensates the paucity of sunlight and ventilation in the rooms. It is multifunctional used for drying, grinding and husking of grains, sleeping accommodation

to women and children during summer night and sunbasking during winter days, cooking and bathing purposes, and holding various religious and social ceremonies. Poor people whose financial conditions do not permit to construct multi-room house and central courtyard enclose front or back portion of their houses by walls which besides indoor activities is used for keeping cattle and agricultural implements. On the contrary rich farmers go for large courtyards sometimes two or three to maintain family privacy. In general a courtyard in Hindu houses has a north-south elongation and east-west elongation (Suryabedi plan) is often considered inauspicious. In big houses it is surrounded by narrow verandah on all sides and has pucka floor.

6.3.2. Verandah :

Verandah is another typical feature of rural houses throughout the region. It is pucka with concrete/stone slabs (roofs) in rich houses while thatched made of grasses and sugar cane leaves in the houses belonging to poor families.

Verandah is generally of two types: (i) Outer - covering the entire length of the house in front of the main gate. It is used for many purposes e.g., male sitting room, guest reception, keeping cattle and their fodder, and for sleeping and taking rest. Village artisans

like gold-smiths, barbers, potters, carpenters, merchants and village doctors etc. sometimes use it as showroom for carrying on professional duties. (ii) the inner verandah surrounds the entire length and breadth of the courtyard, and are used as kitchen cum dining room, sleeping room for females and children, store room for grains, agricultural implements and fodder and sometimes also a cattle-shed. These verandahs protect the walls and floors from getting damp during rainy season and provide covered passage to rooms.

Other important features of rural dwellings, in the region, are rectangular or squared plan, mud walls without windows and ventilators, flat clayey roofs, narrow rooms with mud floors of different size and absence of toilet facilities. The absence of windows and ventilators is partly due to the security against theft and partly to maintain family privacy. But the lack of lavatories and good drainage make the whole surrounding unhealthy and suffocating.

A raised earthen platform (Chabutara), in front of the main gate, is a typical feature in many of the rural dwellings of the region (Plate No. 25). On an average it is 0.5 to 1 metre high and is used as a sitting and gossiping place in summer evening and winter days and for drying grains.

The door, a significant feature of rural houses, consists of two wooden wings revolving on two pivots fixed in the wall. In rich houses it is decorated with beautiful carvings while in poor families the doors are mainly made of split bamboos. The cowdung plaster of the floors and clay plaster of the walls make the dwellings clear germ-free and long lasting.

6.3.3. Ground Plan :

The ground plan of rural houses is generally affected by the socio-economic status and functional needs of the house-holders (Fig. 6.1A). A single rectangular room with thatched verandah is the typical feature of the poor man's dwellings (Fig. 6.1A.a) while rich farmers require multi-room dwellings with big courtyard for people, cattle and storing agricultural products (Fig. No. 6.1A). The single room dwelling of a poor farmer varies, in size from 3 x 5 m to 5 x 8 m. and has a raised platform or a verandah in front of the main door, which is used for receiving guests or for keeping cattle during night. Sometimes another room is added adjacent to the first one for storing grains and house belongings, while the first room is used as a kitchen or bed room.

In three room dwellings generally 'L' shaped plan is prevalent. The third room is either used as a store

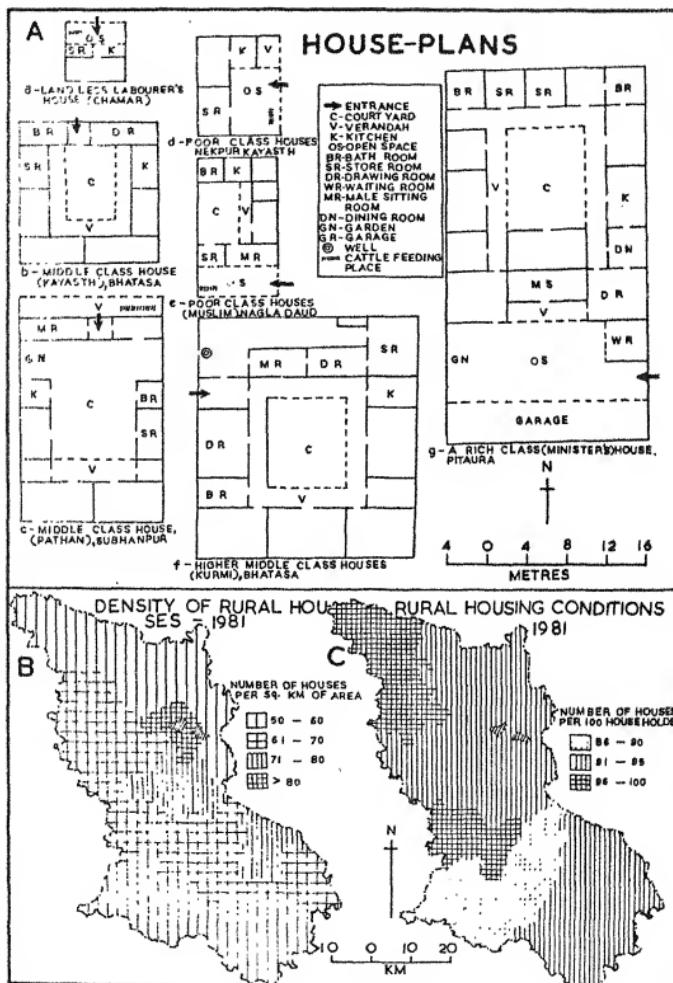


FIG 6-1

or male sitting room. The four room plan differs from house to house. Somewhere two-room apartments are kept in 'L' shaped form while in other cases they are put in 'U' shape. In such houses one room is used for storing the house hold things, second as bed-room, third for grain-store-cum-kitchen and fourth as a guest-room. The five-room dwelling presents a full fledged middle class peasant's house. Here fifth room is added to the fourth side parallel to the outer verandah and is called 'deorhi'. It has two doors one used as maingate opening in the outer verandah and second opening in the courtyard. These doors do not face each other so as to maintain family privacy. 'Deorhi' invariably has an upper room called 'Kotha' or 'Patan' which is used for storing grains and house-hold goods. Similar 'Kothas' may also be constructed in other rooms to increase the storing capacity of the house.

The houses belonging to former zamindars and big land lords contain many rooms (7, 9 or 11 rooms), two and three courtyards, separate cattleshed and outhouses for male members and guests (Fig. 6.1A). In order to maintain strict 'purdah' system such houses have latrines and bathrooms especially for female members of the family. There is a notion prevalent amongst Hindus to have north-south elongation of the houses with the front door facing

the east or the north. Similarly location of the cattle shed in front of the house, main drain in the north or east, drinking water well in the east or north, kitchen in the south-east or south-west corner and 'chandravedi' plan of the courtyard are all tradition bound but in full conformity with climatic and physical characteristics of the Ganga Plain.

6.3.4. Foundation and Floor :

The foundation of mud walled single storey house is not very deep and strong (0.3-1.0 metre). The foundation laying ceremony begins on some auspicious day followed by a feast to the Brahmans. Similar ceremony is performed on the completion of the house followed by the good feast to the Brahmans and relatives. The floor of the house is generally kachcha, which is usually kept clean by plastering with cowdung. The level of the rooms is slightly higher than the courtyard which evidently has a gentle slope towards north or east to facilitate easy drainage of rain water.

6.3.5. Walls and Roofs:

The walls of the rural dwellings are usually 'Kachcha', made of clay (Plate No.14), which is obtained from the village pond. The lumps of mud (called 'laundha') are kept one after another to form a layer of 30 to 40 cms. of thickness (called 'radda'). When it is dry and hard the process is repeated to raise the wall to the

required height, (generally two to four metres). In many cases the sundried bricks or mud-cakes are also used in the construction of walls to give it smoothness and uniformity. To provide extra strength to the walls and also to protect their erosion during rainy season these walls are plastered by a thick coat of clay mixed with cowdung, grasses and straw dust, etc., Every year, when the rainy season is over (on the occasion of Deepawali) these walls are repaired and given a new look after putting a new coat of thin plaster.

In those parts of the region where soils are light and friable and floods are very common walls are made of wattle or burnt bricks. The use of burnt bricks is increasing day by day in the construction of the walls of the rural houses owing to their longevity and low maintenance cost.

Except a few exceptions, the majority of the rural dwellings of the region have flat clayey roofs (Plate No.14). Beams of 'neem', 'sheesham' or 'mahua' trees are laid transversely into the walls which are covered with wooden planks, stalks of 'arhar', 'bamboo pieces or tamarisk etc. This is covered with a thick layer (about 0.25 m.) of prepared clay and muds. The top is levelled and smoothened by the cowdung plaster and outlets (made of tin or burnt clay) are fixed to drain out rain water. Before the

beginning of rainy season fresh plastering is added to protect them from erosion by rains.

The houses of poor farmers do not have clayroofs instead these are thatched using 'munj' 'arhar', 'Kans' and sugarcane leaves etc. The wooden posts (ballis) are laid transversly over the walls which support the thatched cover lying over them.

The tiled roofs are no where seen in the region due to non-availability of good quality burnt tiles. Similarly asbestos or corrugated iron sheets are rarely seen in the construction of roofs in the rural areas. In recent years middle class farmers are going for the construction of stone slab or concrete roofs owing to their durability and less maintenance cost.

6.4. HOUSE TYPES :

The physical conditions determine the type of building material used for the construction of rural houses while the socio-economic status of their occupants determine their size, shape and function. The interaction of physical and human factors gives characteristic type to the dwellings in a region or part thereof (Tiwari, 1980, p. 265). The rural dwellings of the study region have been classified, here, on the basis of their (a) building material, (b) size and shape, (c) socio-economic

status of the people, and (d) functions etc. and finally their broad regional types have been determined by combining all these attributes together:

6.4.1. Based on Building Materials :

Farrukhabad, being the part of the Ganga-Yamuna Doab, possesses the large quantity of clay and mud, which are used for the construction of Kachcha walls (66.35%) and roofs (65.96%) of the rural dwellings (Tables 6.II, 6.III).

Table 6.II
WALL MATERIALS USED IN RURAL DWELLINGS

Sample villages	Percent of wall material				
	Mud	Unburnt Bricks	Burnt Bricks	Grass Leaves Bamboo etc.	Misc.
Aligarh	20.6	45.2	30.1	4.1	-
Bhatasa	28.3	26.9	41.2	3.6	-
Ganglaoo	43.2	32.4	23.4	1.0	-
Kabeerpur	49.1	21.6	27.2	2.1	-
Mohaddinagar	37.9	37.7	21.0	3.4	-
Nagla Daud	28.7	21.4	48.7	1.2	-
Nekpur	54.2	31.5	12.4	1.9	-
Sarai Daulat	33.6	18.5	46.2	1.7	-
Sarai Sunder	52.2	24.4	18.9	4.5	-
Subhanpur	18.9	39.8	38.1	2.7	0.5
Average	37.11	29.24	30.82	2.78	0.05

Table 6.III
ROOF MATERIALS USED IN RURAL DWELLINGS

Village	Percent of Roof Material				
	Clay	Concrete	Bricks	Grass, leaves, Bamboo, etc.	Misc.
Aligarh	66.8	12.7	4.4	16.1	-
Bhatasa	56.0	11.4	6.5	23.3	2.8
Ganglaoo	86.2	1.8	-	11.6	0.4
Kabeerpur	68.7	6.5	-	24.8	-
Mohaddinagar	74.1	5.3	-	20.6	-
Nagla Daud	58.5	8.2	1.0	32.3	-
Nekpur	70.3	1.6	-	28.1	-
Sarai Daulat	63.7	16.8	2.5	15.3	1.7
Sarai Sunder	53.3	2.7	1.4	42.6	-
Subhan pur	65.2	13.4	8.4	12.5	0.5
Average	65.96	8.34	2.12	23.02	0.56

Source : Villages' Survey.

Similarly village orchards, barren lands and river banks supply the wood and thatching material to be used for building roofs. On the basis of building material following broad categories of dwellings may be identified in the region (Table 6.IV) :

Table 6.IV
HOUSE TYPES

Nature of Dwellings	Percent
Mud Wall/Flat Roof	23.1
Brick Wall/Pucka Roof	11.3
Brick wall/Flat Roof	42.9
Mud Wall/Thatched Roof	19.9
Wattle Wall/Thatched Roof	2.8

Source : Survey of sample villages.

(a) Mud Wall/Flat Roof Dwellings :

Mud wall flat roof dwellings are very popular throughout the length and breadth of the study region (Plate Nos. 4 and 28). Mud walls are constructed both by using unsorted clay or sundried bricks and with flat clayey roofs whole house looks like a heap of mud. Such houses are less expensive due to low cost of building material but need repairing every year particularly before and after rainy season. They are cooler than tiled or concrete roofs and are invariably accompanied with thatched verandah (Plate 16).

(b) Brick Wall/Pucka Dwellings :

Houses using burnt bricks as wall material and stone-slabs, concrete and bricks mixed with mortar as

roof material are gradually finding popularity in higher and upper middle class families of the rural areas (Plates 18 to 21). Such houses are now regarded as a symbol of social status and prosperity. Prior to independence these houses were only constructed by big land lords and zamindars but due to easy availability of bricks, cement, stone slabs and iron together with their low maintenance cost and cleanliness, these are gradually gaining popularity in rural areas too. A farmer now prefers to construct one room of pucca house rather than going for multi-room traditional dwelling.

(c) Brick Wall/Flat Roof Dwellings :

Brick wall flat roof dwellings represent the transition stage between traditional and modern houses. Here burnt bricks replace the sundried bricks to give extra strength to the walls especially in low lying areas or the region ravaged by floods. Sometimes an outer protective layer of bricks is added to mud walls to protect its erosion from rains. Such houses occupy a very negligible part of rural dwellings in the study area.

(d) Mud Wall/Thatched Roof Dwellings :

Such dwellings generally belong to low income groups and poor farmers (Plate 15 and 16). Their construction is easy and less expensive but need repairing every year. Though these houses are cooler and more airy but are

susceptible to fire damages.

(e) Wattle Wall/Thatched Roof Dwellings :

In areas of feriable and sandy soil mud walls can't stand floods and waterlogging. Here houses are built of wattle with thatched roofs. Such houses are generally seen in Ganga Khadar region (Rajepur block), where plenty of 'Kans' and tamarisk are available for their construction. The temporary huts of fishermen, vegetable growers and Gangaputras along the bank of the Ganga also belong to this category.

6.4.2. Based on Size and Shape :

The size of the house is primarily determined by cultural factors such as the economic conditions and the size of the family (Mandal, 1979, p. 186). Field survey of sample villages shows that high castes and big land holders like Rajputs, Brahmans, Pathans, Kayasths etc. own multiroom large houses (Plates 18, 19, 20 and 21). Owing to the prevalence of joint family and purdah system multi-room houses are dire necessity in such castes. On the contrary low castes and landless labourers like Chamars, Dhanuks, Pasis etc. who have smaller family* and have less regard for purdah system generally live

* In low castes grown-up child prefers to live in separate house alongwith his wife and children.

in one or two-room houses. Based on the sample studies conducted during 1971 census 66% of the total rural households live in one or two-room houses, while big houses with five or more rooms only accommodate 8.6% of the rural households of the region. Remaining 25.4% of the total rural households mostly consisting of backward castes like Ahirs, Kurmis, Kachhis, Lodhs, Kisans and Nais etc. live in 3 and 4 room houses.

Similarly the number of rooms has direct bearing on the shape of the rural dwellings. That is why we have 'I' shaped houses with one or two rooms, 'L' shaped houses with three rooms, 'U' shaped with four rooms and rectangular houses having five or more rooms.

6.4.3. Based on Socio-Economic Status :

The socio-economic status of the house owner plays a key role in determining the size, morphology and building materials of the rural houses. Socially advanced castes with large landed property (Brahmins, Rajputs, Kayasths, Pathans, etc.) live in large houses where every young female is allotted separate room. Such houses have separate kitchen, store room, guest room and cattle shed, etc. Some Muslim castes like Pathans, Sheikhs, and Saiyeds, who have comparatively big joint family and practice strict 'Purdah' system, own large spacious houses with

big courtyard (Plate No. 18). Saiyeds (mostly belonging to Shia sect.) even do not allow their women folk to talk loudly so that their voice could be heard from outside. Hence their houses have spacious courtyard. Some of these houses have separate 'Murdanah' or 'Deewan Khana' in their outer part to receive male guests or 'Bazakhana/Imambara' to hold Moharram and other religious ceremonies.

Agricultural castes like Ahirs, Kachhis, Kurmis, Lodhs, Kisans etc., mostly live in medium size houses. Recently these castes with their hard labour are gaining economic power and are going for the construction of large houses. Low castes like Chamars, Pasis, Dhanuks, Mehtars, etc., who own very little amount of village land or are landless labourers mostly reside in one-room houses. Some nomadic tribes like Banjaras and Jogis live in one room huts or hovel like houses jointly shared by men and cattle both.

6.4.4. Based on Functional Characteristics :

More than 80 per cent of rural dwellings in the study area are used for residential purposes while shops, public utility services (School, hospitals, dispensaries, panchayatghars, banks, post offices, etc.), business establishments, hotels, religious places, etc., occupy a negligible portion of it. Most of the houses are

built for personal use and except near the towns and large urban centres they are never rented.

6.5. REGIONALISATION OF HOUSE TYPES :

On the basis of foregoing analysis following main house types may be identified in the region :

1. Mud wall flat clayey roofs
2. Brickwall pucca roofs
3. Wattle wall thatched roofs

6.6. LIVING CONDITIONS :

The houses, in rural areas, though emerging from the vast sea of greenery and serene atmosphere remain unhealthy and congested owing to their unplanned and haphazard growth, absence of broad lanes, drainage, sewer system, sanitation and ventilation, etc. More than 90% of the dwellings have no latrines. Even in certain well to do families lavatory facilities are only available to females while menfolk prefer to go to nearby open fields for natures call. This open-air-lavatory is very distressing feature of the rural environs. Houses rarely have provisions for windows, ventilators, chimneys for smokes, bath-room etc. At times cattle-sheds and manure pits are kept nearby. Open drains and cesspools of water are not only the

breeding grounds for mosquitoes and flies but make the living worse during rainy seasons (Plate No. 25). Village well and ponds, the main sources of drinking water, remain polluted (Plate No. 24) posing serious health hazards.

In low caste houses at times cattle are kept in same room meant for human beings. Similarly castes like Pasi and Mehtar etc. often build their piggery sheds attached to the main house exposing the whole population to a number of diseases. The rural society because of its poverty, illiteracy and belief in superstitions is not ready to do away with many of these wrong notions and is less receptive to development programmes.

Since there is no resting place for males during daytime. They either work in the fields, gossip around the fire place during winter evenings or assemble in 'Chaupal' for recreation. Women folk due to lack of sunlight and balanced food become anaemic and prone to numerous diseases. Very little care is taken to isolate patients suffering from infections ^f diseases like cholera, smallpox, typhoid, malaria, tuberculosis etc. which often take a heavy toll of village lives. Post-delivery care for mothers and children is often neglected.

But in certain educated and advance families, which have urban impact, traditional houses are being replaced by modern dwellings which are provided ^{anti-} good ventilation,

better drainage and sanitation, etc. Some of these houses even maintain small gardens to make the whole surroundings clean and invigorating (Plates No. 19 and 20).

Besides the acute congestion found in rural dwellings (66% of rural house-holds live in one or two-room houses) there are many families which are deprived of housing facilities. Table 6.I clearly demonstrates that there is wide gap between the number of houses and rural house-holds in the region (93 houses per 100 rural house-holds, U.P. 92 houses). Among the blocks Nawabganj has the highest number of houses (99) per 100 house-holds followed by Kaimganj and Chhibrampur (both 98 houses). On the contrary Talgram (88), Haseran and Saurikh (both 90 houses) blocks have atleast 10 percent such families which are deprived of housing facilities (Figs 6.1c).

In order to improve rural housing conditions the National Building Organization under the Ministry of Works and Housing, Government of India and the Central Research Building Institute, Roorkee, have taken up many projects to study rural housing problems and suggest ways and means to overcome them. They have prepared designs of some low-cost rural houses which have better amenities and are more durable and less expensive (Saxena, 1976). The government under the IRD programmes is providing new

houses and house sites to economically weaker sections of the society to improve rural housing conditions in recent years.

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CHAPTER 7FUNCTIONAL ORGANISATION OF RURAL SETTLEMENTS

The settlement history of the study area exhibits the development of villages housing a number of service castes like Nais (for cutting hair and helping family priest in performing religious and social ceremonies), Kahars (for providing drinking water), Kumhars (for supplying earthen pots), Lohars (for mending plough and agricultural implements), Barhais (for wood work), Dhobis (for washing clothes), Julahas (for weaving cloths), Chamars (for supplying shoes and carrying dead animals) and Banias (for supplying household goods), etc. under the 'jajmani' system to provide services to its own inhabitants and surrounding hamlets. These central villages may be termed as the initial nodes of rural service centres above which lie the rural 'hats' or markets, many of which have been initiated under the patronage of the zamindars or clan chiefs at the seat of their administration. The pargana centres were still bigger in size housing specialized services, beyond which were found 'subah' headquarters with urban characteristics. This traditional system of service centres functioned well till the arrival of the Britishers who introduced a new hierarchy of functional organisation to suit their interest. Though it led to the vigorous growth of higher

level centres those located at lower level were made to starve and die out. Since higher level centres are mostly exploitative in nature, these have led to the draining out of the rural resources to promote unplanned growth of urban agglomeration. The purpose of this chapter is to throw light on the spatial pattern of rural service centres in Farrukhabad district, divide them into hierarchical orders, delineate their complementary areas so as to locate the functional gaps for developing an unified pattern of service centres by 2001 AD which could lead to balanced regional development of the area and enabling rural region to reap maximum benefit out of its resources.

7.1. MEANING AND DEFINITION OF SERVICE CENTRES :

A service centre (Christaller's 'Zentralort') refers to any permanent settlement which provides goods and services to its surrounding hinterland population. There is a hierarchical grading of Central places depending upon the degree of concentration of central functions. The larger the centre the more complex centralized functions it performs and greater the tributary area (Berry and Garrison, 1958, p.145). Tributary areas of centres are hexagonal in shape and centres of same hierarchical order are uniformly spaced forming a series of hexagons to cover the entire region.

Mark Jefferson (1931) was perhaps the first scholar to term these settlements "Central places", and identified their growth based on the location and requirements of the surrounding area. Later on Walter Christaller (1933), the father of "Central place Geography", in his book "Die Zentralen Orte in Suddutschland" presented the central place theory based upon the functional distinctiveness of a permanent settlement, fulfilling the socio-economic needs of its surrounding area. Following him many scholars like Robert E. Dickinson (1932), A.E. Smailes (1944), John E. Brush (1943), H.E. Bracey (1953), A. Lgsch (1954), F. Perroux (1950), B.J.L. Berry and W.L. Garrison (1958), L.J. King (1962), M.P. Dacey (1966), J.U. Marshall (1969), etc. made their contributions on one or another aspect of central place studies. So much so that a service centre is today regarded as a process of various economic and social activities and plays pivotal role as agent of transformation, modernisation and innovation diffusion. It may also be regarded as a geconomic or commercial capital of a region. Service centres of different hierarchical order together constitute a well-knit functional system which may include an entire country or part thereof.

"These service centres may house administrative, educational, trade and commerce, transport and communication, medical and other services choosing their

locations at transport junctions, market places or at the seats of local administration. A well developed functional system helps in the dissemination of new ideas and innovation accelerating the pace of economic progress , whereas a truncated system leads to spatio-functional gaps whereby higher order centres become parasitic in nature swallowing the gains of planning programmes" (Tiwari and Khan, 1984, p.88).

7.2. CENTRALITY AND WEIGHING SYSTEM :

The centrality may be defined in terms of quality and quantity of central functions performed by the settlements, (Wanmali, 1970). It is very much related with the size of population and the complexity of functions performed by the settlement. According to Khan (1977) it is an expression of the consumer behaviour of population of an area, on the basis of which service centres can be arranged in a hierachic order.

In order to compute the centrality value of service centres in a region, certain variables are taken into account. Christaller counted the number of telephone connections and ranked the central places of West Germany into seven hierarchical grades, ranging from regional capital to market hamlet. His idea was criticised by a number of scholars, who pleaded for the inclusion of

many others facilities for calculating the centrality of a service centre. In America, Dickenson (1932, pp. 19-31) considered the provision of goods and services to the surrounding area and suggested the four-tier hierarchy in centrality. Similarly Kolb (1933) also identified four grades in central places, on the basis of milk supply, presence of services like high school grocery shop, church, library, marketing and banking facilities. Trewartha (1943, pp. 32-81) based his directions upon the functional attributes and agglomeration size, while Smailes (1944, pp. 41-51) considered the indices of the essential functions and institutes of different degrees ranking the central places into five hierarchical orders. Green (1952) and Carruthers (1957) measured the centrality value and the sphere of influence of service centres on the basis of the bus services. Brush (1953, pp. 380-402), the bitter critic of Christaller's method proposed a three-tier grading in lower order service centres: hamlet, village and town. Carter (1955, pp. 43-56) used commercial functions to identify three grades of central places, putting emphasis on the importance of historical factors on their development.

Similar attempts of numerically measuring the centrality of service centres were made by Green (1952), Carruthers (1957), Goullund (1956) and others. Godlund based his studies on selected retail trade as an index

the percentage of persons employed in retail trade, to total population.

Amongst Indian scholars mention may be made of K.N.Singh (1966, pp. 218-226), O.P.Singh (1968, pp.83-127), Wanmali (1970, pp. 79-85), S.M. Singh (1970, pp.266-267), Sen (1971, pp. 80-96), Nityanand (1976), W. Khan (1976), S.B. Singh (1977, pp. 46-60), Kumar and Sharma (1977, pp.19-29), Singh and Pathak (1980) and Tiwari (1980) etc. suggesting different methodology for calculating centrality of service centres in different parts of the country. For example, Prof. K.N.Singh used modified form of Godlund's formula as follows for identifying rural markets and rurban centres' in Eastern Uttar Pradesh:-

$$C = \frac{N \cdot 100}{P}$$

where, C is desired centrality,

N is number of people engaged in commercial activities, and P is the total regional commercial population.

Vishwanath (1967) also adopted this formula for his studies in Mysore state.

7.2.1. Method used in the present work :

Since the development of service centres in an old settled region, like Farrukhabad district, is affected by the complex nature of physico-socio-cultural processes, no

single criterion will be suitable for identifying such service centres. Hence, Tiwari's (1980) guidelines have been adopted in the present work for the identification and ranking of service centres in the region. Accordingly the qualifying limit of a settlement to function as a service centre has been determined on the basis of five major service groups (a. education, b. medical, c. transport - communication, d. trade-commerce and e. administration) comprising of 28 central services (Table 7.1) alongwith the persons engaged in tertiary activities as percentage of total working population. Hence a settlement, fulfilling one of the following requirements, has been recognised as a service centre, provided it is connected with road or railways and has atleast 25workers engaged in tertiary activities:

(i) Any three of the five services with atleast 8% of its working population engaged in tertiary activities (the percentage being the district's percentage of rural tertiary population and a settlement having lower share than the regional average cannot justify its claim to be chosen as service centre).

(ii) Any two of the five services with atleast 12% of its working population deriving livelihood from tertiary services.

TABLE 7.I
CENTRAL SERVICE GROUPS AND SERVICES

Service Groups	Services	Score value
A. EDUCATION :	1. Junior basic school	1
	2. Senior basic school	2
	3. Higher secondary school	3
	4. Degree College	12
	5. Industrial institute/Teachers' training centre	20
B. MEDICAL :	6. Hospital	4
	7. Maternity and child welfare centre	5
	8. Family planning centre	8
	9. Primary health centre	9
	10. Veterinary hospital	9
C. TRANSPORT & COMMUNICATION :	11. T.B. Hospital	35
	12. Telephone	1
	13. Post-office	2
	14. Telegraph Office	7
	15. Railway Station	7
D. FINANCE :	16. Market/hat	3
	17. Mandi	13
	18. Bank	4
	19. Co-operative Bank/ Rural Credit societies	7
E. ADMINISTRATION :	20. Police station	8
	21. Nyay Panchayat HQ	3
	22. Block HQ	9
	23. Town Area	13
	24. Municipal Board/ Cantt	16
	25. Tahsil HQ	18
	26. District HQ	35

(iii) Any one service with at least 16% of its working population dependent upon tertiary activities.

(iv) 20% of its workers engaged in tertiary activities with or without any of the services mentioned above.

Following this methodology 125 settlements (including 11 urban centres) have been identified as service centres in Farrukhabad district (Fig. 7.1A). Besides there are 135 developing service centres in the region which fulfill one of the following conditions:

- i. Three of the five services.
- ii. Two services with atleast 4% of its working population dependent upon tertiary services.
- iii. One service having atleast 8% of its working population, busy in tertiary activities.

Such developing service centres should be connected with Kachcha or pucca village roads and should house at least 10 persons engaged in tertiary services. After selecting the service centres their centrality has been measured by using the following formula (modified after Godlund, 1956, pp. 13-14).

$$C = \frac{P \cdot 100}{T}$$

where, C = desired centrality,

P = number of persons dependent upon tertiary services in a rural settlement unit,

T = The region's total of tertiary rural population.

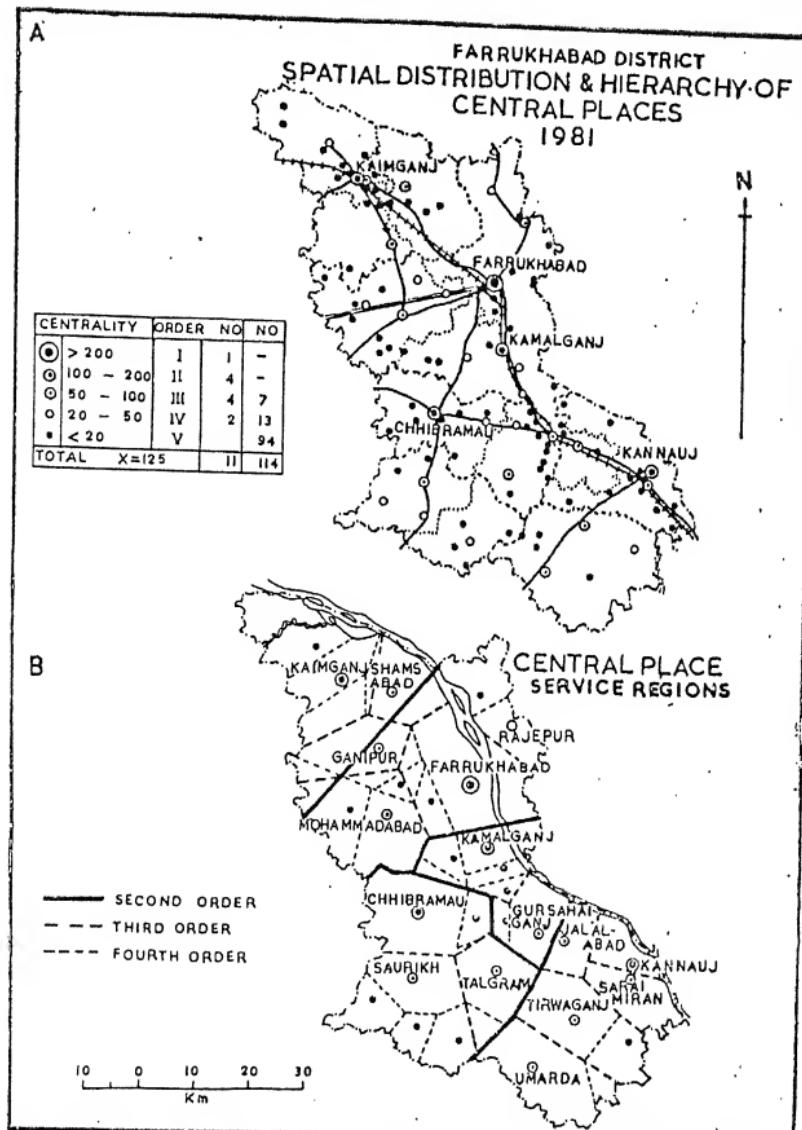


FIG. 7.1

In order to give due importance to central services these centrality values have been weighted by standard scores, allotted to each of the 26 services (Table 7.I) on the basis of their grouping and frequency in the region. The enhanced centrality values (called centrality scores) now range from 1.13 in Disrapur to 358.16 in Farrukhabad-cum-Fatehgarh.

7.2.2. Population Size vs. Centrality :

The centrality of a service centre has a close relationship with the population size and the number of functions performed by it. In order to examine this statement a correlation analysis has been attempted in figure 7.2 which shows strong positive correlation between these two variables ($r = +0.8700845$). But a closer observation of figure 7.2 exhibits that the distribution is not perfectly linear and there are a number of other factors like means of transport & communication, administrative advantages etc. which do have their impact in affecting the centrality of the service centres. That is why Kamalganj (136.63), a block headquarters, records same centrality value as that of Kaimganj (137.63), Chhibramau (131.74), which are tahsil headquarters and have larger population (Kaimganj: 20,528; Chhibramau: 23,263) than the former (Kamalganj population: 8,788) owing to its proximity with the district seat of administration and better accessibility. Similarly Sarai Miran, a few Kilometres away from Kannauj along the the G.T.

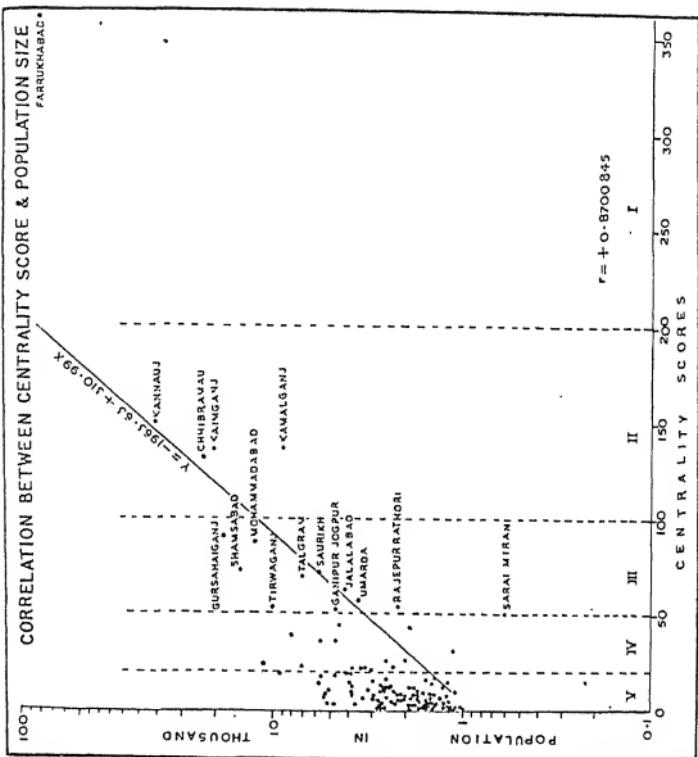


FIG. 7.2

road and rail route even though with a small population of 607, records higher centrality value of 50.37 (IIIrd order). There is about one and a half time gap between the population size of Shamsabad* (pop. 14, 919) and Saurikh (Pop:5710) (Plate No. 28), but both being block headquarters, almost house same number of services and same centrality scores (72.86 and 72.14 respectively). There are numerous examples of old and decaying towns which earlier had better transport accessibility and higher centrality scores but owing to the adoption of new transport technology (for example from river to rail transport or road transport) there has been phenomenal decline in their importance and centrality values.

7.3. SPATIAL PATTERN OF SERVICE CENTRES

The spatial pattern of service centres (Fig. 7.1A) shows their maximum concentration along the transport routes, near the urban centres or seats of administration and in the areas of good agricultural harvests. Amongst development blocks Nawabganj and Jalalabad (4 service centres each) house the minimum number of service centres, whereas, Talgram (18 service centres) and Barhpur (13 service centres) come on the top (Table 7.III) owing

* Though Shamsabad has been recently classified as Urban centre during 1981 census owing to its large population size, but it comparatively houses less number of services and looks like an overgrown village.

TABLE 7.II
HIERARCHY OF RURAL SERVICE CENTERS

Name of the block	Number of service centres Hierarchical orders					Density/ 100 km ²	
	I	II	III	IV	V	TOTAL	
Kaimganj	-	1	-	2	9	12	3.28
Nawabganj	-	-	1	-	3	4	1.73
Shamsabad	-	-	1	-	6	7	2.01
Rajepur	-	-	1	1	4	6	1.75
Barhpur	1	-	-	-	12	13	8.18
Mohammadabad	-	-	1	3	8	12	2.90
Kamalganj	-	1	-	3	8	12	3.62
Chhibramau	-	1	-	1	7	9	2.78
Talgram	-	-	2	1	15	18	6.27
Saurikh	-	-	1	2	2	5	1.91
Haseran	-	-	-	1	5	6	2.83
Jalalabad	-	-	1	-	3	4	1.89
Kannauj	-	1	1	-	9	11	3.82
Umarda	-	-	2	1	3	6	1.12
District							
Farrukhabad		1	4	11	15	94 125	2.90

to the impact of transport routes. There is a cluster of service centres around Gursahaiganj, through which pass the G.T. road, the link road to Farrukhabad, and Kanpur-Kasganj railway line. Similarly Barhpur block, housing district headquarters, is advantageously located in respect of transport routes, trade facilities and agricultural productivity. Next in order come Kaimganj, Mohammadabad and Kamalganj blocks (each having 12 centres) which enjoy better agricultural prospects and transport facilities.

The density of service centres is maximum in Barhpur block (8.18 service centres/100 km²) followed by Talgram (6.27), Kannauj (3.81), Kamalganj (3.62) and Kaimganj (3.28), etc. (Table 7.II). But blocks like Umarda (1.12), Nawabganj (1.73) and Rajepur (1.75) have the lowest density of service centres due to recurrence of floods, and low agricultural productivity.

Analysing through nearest neighbour analysis, (Clark and Evans, 1954 and Clark 1956), the spatial distribution ~~on~~ service centres, in the region, exhibits a tendency towards regularity ($R_N = 1.955$, Table 7.III). This tendency is more pronounced in second order centres ($R_N = 1.786$), while fifth order service centres show random distribution ($R_N = 0.939$). These findings are also confirmed through normalised index (D_i) values which except in case of fifth order centres ($D_i=0.4368$)

Table 7.III

SPATIAL CHARACTERISTICS OF RURAL SERVICE CENTRES, 1981

Hierarchical order	Centrality score	No. of centres	R N value	Observed mean distance km	Hypothetical distance km	Hypothetical No.	Average population	Actual No. as percent of population	Actual mean	D ₁
First	> 200	1	-	52.00	70.56	1	167.56	100.00	73.69	0.7366
Second	100-200	4	1.786	29.32	35.28	5	233.99	80.00	83.11	0.8308
Third	50-100	11	1.254	12.41	21.27	19	75.74	57.89	58.34	0.5631
Fourth	20-50	15	1.248	10.58	18.22	26	43.08	57.69	58.07	0.5805
Fifth	< 20	94	0.939	3.18	7.28	21.7	231.6	43.31	43.68	0.4365
Region		125	1.955	5.74	6.31	268	4960	46.64	90.57	0.9052

lie. between 0.5805 and 0.8308 (regional average being 0.9092).

The observed mean inter-centre distance comes to 5.74 Km which is slightly less than hypothetical distance (Mather 1944) of 6.31 km observed under the hexagonal system. Also the observed mean distance which goes on increasing from lower to higher order centres (Table 7.III), is everywhere less than the hypothetical distance. Similarly the actual number of service centres is only 46.64% of the hypothetical number. It may well be concluded that a $K = 4$ hierarchy (Christaller's traffic principle) holds more relevance to the region than $K = 3$ and $K = 7$ indicating the impact of transport routes on the development of service centres.

7.4. HIERARCHY OF SERVICE CENTRES :

Five hierarchical orders in service centres of the study area, have been determined on the basis of their centrality scores, taking into consideration the natural break points. (Table 7.III). Judging from the national point of view the study area does not house any first or second order centres. It lies within the gravitational pull of Delhi, the national capital and Kanpur, the industrial hub of the Ganga plain, with whom it is well connected with rail and road links. On regional basis Farrukhabad -cum-Fatehgarh U.A. (Centrality score 358.16) comes on the top, which by virtue of being district seat of administration houses a number of specialised services like

municipal board, cantonment, degree college, technical institutions, T.B.Clinic, District hospital, Head post and Telegraph office, Banks, etc. The second order centres, numbering four (Kannauj 150.47, Kaimganj 137.24, Kamalganj 136.63 and Chhibrampur 131.74), include three tahsil headquarters and a town. These house services like degree college, hospital, sub-post office, mandis, co-operative banks, etc. Kamalganj, a block headquarters, has recently developed as an important trade centre.

Third-order service centres (centrality score 50-100), numbering eleven, are either towns or large urban centres well connected by roads etc. They provide lower order, services like bi-weekly markets, intermediate college, primary health centre, veterinary hospital, co-operative societies, etc.

Fourth-order service centres (centrality 20-50) are fifteen in number which include two small towns (Kampil and Sikandarpur Plates no.11 and 12), One block head quarter (Haseran), and some old and large villages like Siroli, Sakhrawa and Pipargaon etc. They provide services like weekly/bi-weekly market, senior basic school, dispensary, police chowkies, bus-stop, etc.

The remaining ninetyfour service centres (centrality score below 20) occupy the fifth and the lowest hierarchical

position in the district. These centres house 'nyaya Panchayats', junior basic school, weekly market, request bus stop, co-operative credit societies, etc. The group include villages like Samdhin, Yaqootganj, Manjhpurwa and Bishungarh, etc.

7.5. SERVICE REGIONS OF SERVICE CENTRES :

The service regions of a service centre may be defined as the immediately contiguous area surrounding it and benefitted by its services. It may also be called as "complimentary region", "Umland", "tributary area" or "hinterland" of a service centre. This entire area is not only benefitted by the centralised services of the service centre but is also witnessed by new socio-economic changes and innovations.

Various methods have been used by the scholars to delineate service regions by using qualitative as well as quantitative techniques. While Christaller has utilised the centrality and hierarchy of respective service centres for the purpose, Godlund (1956, pp.13-14) and Green (1952) have utilised the data of bus services to identify such regions. Bracey (1953 and 1956) has used new rural component of centrality in their delineation while Berry (1967 p.40) has utilised "Reilly's (1931) law of retail gravitation" and "breaking point equation" for the purpose. Here following formula, as modified

after Berry, has been used to delimit the service area of different service centres in the region:

$$\cdot LS = \frac{D}{1 + \sqrt{\frac{AC}{BC}}}$$

where, LS = limit of service region of A from B,

D = distance between two centres (A and B).

AC =centrality score of A, and

BC =centrality score of B.

Thus we have five categories of service regions as shown in figure 7.1B and Table 7.IV.

7.5.1. Farrukhabad Region :

Farrukhabad-cum-Fatehgarh first order service region incorporates the whole of the study area including within its bounds 125 service centres which collectively serve 1771 villages housing 19,49,137 people. This centre area is further sub-divided into five second order regions:

a. Farrukhabad-cum-Fatehgarh City Region :

It is the largest second order region (vide fig. 7.1B and table 7.IV) covering a total area of 1147 km^2 . and inhabiting 5,96,373 persons. It houses 36 service centres of different order (1:0:3:4:28) which collectively serve 823 villages. The twin towns of Farrukhabad and

TABLE 7.IV
SERVICE REGIONS OF SERVICE CENTRES

Hierarchical order	Service Regions	No.of service centres	No.of villages served	Area served km ²	Popu-lation served
I	Farrukhabad-cum-Fatehgarh	125	1771	4311	19,49,137
II	Kaimganj	20	343	756	3,01,866
II	Kamalganj	25	219	438	2,38,402
II	Chhibramau	23	333	958	3,89,613
II	Kannauj	21	353	1012	4,22,883
II	Farrukhabad cum-Fatehgarh UA	36	523	1147	5,96,373

Fatehgarh, forming nucleus of the region, houses a number of services like the district court, police headquarters, district hospital and T.B. hospital, cantonment, etc. As a trading centre, it not only supplies potatoes to various parts of the country but has world wide fame for its cloth-printing industry. From educational point of view it has a degree college, a polytechnic and a Teachers' Training centre to invite the students from various parts of the district.

b. Kannauj Region :

Stretching over the south-eastern part of the study area it houses 21 service centres (0:1:4:1:15) which together serve 353 villages, covering an area of 1012 km.² and a population of 422,883. Situated along the main transport artery, Kannauj, the focus of the region, has rich historical and cultural background. Besides its traditional perfume/scent industry it houses a number of services located at tahsil headquarters.

c. Kaimganj Region :

Surrounded by river Ganga, in its northern and eastern sides, Kaimganj region houses 20, the least number of service centres (0:1:1:2:16). They together serve a total population of 3,01,866, residing in 343 villages, in a service area of 756 km². It has urban centres like Kaimganj and Shamsabad, the tahsil headquarters and block headquarters respectively. This entire area is very

fertile and famous for the cultivation of tobacco, sugarcane and fruits (Plate No. 3).

d. Kamalganj Region :

This service region, lying in the central part of the district, incorporates the smallest service area, - stretching over 438 km^2 . Here Kamalganj town, a block headquarters, plays a pivotal role bringing within its influence zone 25 service centres (0:1:1:4:19) which together serve 2,38,402 persons, residing in 219 villages of different size. This entire area has good transport facilities and houses a trading centre, (like) Gursahaiganj, which owing to its location along the junction of G.T. road and state highway leading to Farrukhabad and Kaimganj, handles the largest passenger and goods traffic.

e. Chhibramau Region :

Lying in the south-western part of the district, this region covers a total area of 958 km^2 . It has 23 service centres (0:1:2:4:16) which provide services to 333 villages and 3,89,613 people. The G.T. road, passing through the region, has played an important role in the socio-economic development of this entire area and more or less compensates the lack of railway line. Of the two towns, lying in the region, Chhibramau is a tahsil headquarters while Sikandarpur is an emerging trade centre.

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CHAPTER 8PLANNING AND RATIONALIZATION OF RURAL SETTLEMENTS

Planning is a method of achieving economic prosperity by the optimum utilisation of the resources of a region or country (Tiwari, 1984, p.151). 'The basic task of economic planning in India is bring about a structural transformation of the economy so as to achieve a high sustained rate of growth, a progressive improvement in the standard of living of the masses leading to the eradication of poverty and unemployment and provide the material base for a self-reliant socialist economy' (Sixth Five Year Plan 1980-85, p. 17).

Historical Perspective :

Planning in India dates back to Vedic period (Khatu, 1975, p.213). Vatsu shashtra specifically mentions about village planning, but the modern concept of planning is borrowed from the socialist countries. In India the need of planning was felt much before the independence to control the problems like poverty, unemployment, illiteracy, shortage of foodgrains, industrial goods and social facilities. Hence, for the first time the idea of planning was presented by M.Vishweshvaria in 1934 which led to the formation of National Planning Committee (1938). Later on the Bombay Plan (1943) and Gandhian Plan (1944) were introduced which

could not yield desired results owing to the non-co-operative attitude of the British government. After independence with the formation of 'National Planning Commission' massive planning on national scale began and First Five Year Plan was launched with great fanfare in 1952. Since then six Five Year Plans together with a few rolling plans have been completed and the seventh plan is under operation. Though these plans have brought improvements in various sectors of the Indian economy but these have miserably failed to bridge the gap between rich and poor, urban and rural, developed and backward, and industry and agriculture. The larger sufferers have been the rural poor majority of whom living below the poverty line are leading a pathetic life devoid of basic human amenities. Hence a need was felt to reorient our planned programmes and give them rural bias so that to raise the standard of living of the rural poor (landless and marginal farmers).

8.1 STRATEGY FOR PLANNING & RURAL DEVELOPMENT:

The first idea of rural upliftment was initiated by Mahatma Gandhi in 1931 when he advocated development programmes for achieving self sufficiency, promotion of village industries, removal of untouchability and generating basic moral values (Mathur, 1977, p.2) in rural areas. The 'Community Development' Programmes were started in 1952 to give final shape to Mahatma's ideas but same could not yield desired success

due to non-co-ordination among development projects, spatio-functional gaps and lack of peoples participation. This led to a shift in the planning strategy from a broad based (multi-purpose)welfare policy to limited purpose production policy. Accordingly, the Intensive Agricultural District Programme (I.A.D.P.), Intensive Agricultural Area Programme (I.A.A.P.) and High Yielding variety Programme (HYVP) were launched which ultimately paved way for so called "Green Revolution" but accentuated regional/sectoral economic inequalities and made the rich richer and the poor poorer. Consequently under the Fourth and Fifth Five Year Plans a number of special programme (SEDA/MPAL,DRAP,CADP,HADP, ITDP) were introduced to provide economic equity and social justice. The Integrated Rural Development Programme (IRDP), launched on 1st April 1978 aims at integrated harmonious development of rural areas. The main thrust of the Sixth and seventh Five Year Plans is 'growth for social justice, achievement of full employment and removal of poverty' (Singh, 1986, p.XXI). Today rural development is considered as "a strategy designed to improve the economic and social life of a specific group of people - the rural poor. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural areas. The group includes small scale farmers, tenants and the landless". (World Bank, 1975).

Various guidelines have been suggested by scholars for rural development. Rozyeka (1964) has recommended a "geo-

project approach" which includes : (i) delimitation of socio economically depressed areas, (ii) utilization of existing and potential countryside resources, (iii) location of resource based industries at best suited sites, (iv) time factor in resource use, (v) preferential treatment for problem areas, (vi) preferential facilities and subsidies to some socio-economically depressed people of the society, (vii) incentive programmes, and (viii) location of each settlement in the overall hierarchical setup of the region with the provision of infra-structural facilities.

Sen and his colleagues (1971) have advocated for "Micro Level Planning" in which the central village, consisting of a cluster of villages, should form the smallest unit of planning. According to them there must be a network of spatio-functional system consisting of a hierarchy of growth centres for balanced rural development. V.K.R.V. Rao (1977) suggests the rural development plan to take into account: (i) the area, its resources and the complementary links between them, (ii) its residents and the complementary or competitive relations among them, (iii) the potential of self reliance together with the degree of dependence that is inevitable from outside, (iv) the infra-structure, both material and human, necessary for development, (v) the production techniques or the technology that can increase employment, productivity and production including equitable distribution of the gains of development and uplift of the

poor and backward classes of the population, and (v) the institutions, motivations and policies that are needed for co-ordinated increase in production, equitable distribution and utilization of development facilities.

K.C. Lalwani (1978) suggests the need for block level planning to supplement the national plans and remove the regional disparities. According to him such planning should not only take into account the space dimension but establish some sort of coordination between planning machinery at the block and district levels, agricultural universities and social scientists in the country and extension workers (VLOs) at the village level.

Prof. R.L. Singh favours the idea of village cluster planning in which three considerations are of basic concern: (a) mode of production, (b) social Transformation, and (c) the spatial organisation (Singh and Singh, 1978 p.40).

Ramesh and Ramanna (1978 p.140) have emphasized upon three approaches for the formulation of rural development plan at block level : (i) Project formulation which should include a feasibility study to assess the development potential keeping in view the locally available resources, (ii) Project management which includes a detailed implementation plan and the implementation of the project through a well designed monitoring mechanism, and (iii) Project

evaluation showing its impact in terms of employment opportunities generated and the increase in income of beneficiaries participating in the development activities.

In his study of the Lower Ganga Yamuna Doab, R.C.Tewari (1984 p.153) has proposed following strategies for rural-planning:

(i) The whole planning procedure should be re-oriented so as to give it a more rural bias.

(ii) The emphasis should be placed on micro-level planning which should begin from village clusters instead of individual villages (a group of 5 to 10 villages with population of 4000-5000) and should act as complementary to state or national planning.

(iii) Blocks should be selected as ideal units for planning management and should provide essential link, between urban areas and countryside so as to develop infra structure and generate additional impulses for balanced regional growth.

(iv) It should make optimum use of rural resources for planned growth of industries, agriculture, etc. and should lead to self-sufficiency.

(v) It should encourage large scale public participation and should provide ample opportunity for rural employment.

(vi) It should provide basic amenities to the villages and should aim at removing socio-economic disparities in rural areas.

The Planning Commission, Government of India, has chalked out following strategy and methodology for accelerated rural development : (a) increasing production and productivity in agriculture and allied sectors; (b) resource and income development of vulnerable section of the rural population through development of the primary, secondary and tertiary sectors; (c) skill formation and skill upgrading programmes to promote self and wage employment amongst the rural poor; (d) facilitating adequate availability of credit to support the programmes taken up for the rural poor, (e) promoting marketing support to ensure the viability of production programmes and to insulate the rural poor from exploitation in the marketing of their products; (f) provision of additional employment opportunities to the rural poor for gainful employment during the lean agricultural season through a national rural employment programme (NREP); (g) provision of essential minimum needs; and (h) involvement of universities, research and technical institutions in preparing a shelf of projects both for self employment and NRER and in preparing strategies for the scientific utilisation of local resources (sixth Five Year Plan, 1980-85, p. 169).

On the basis of aforesaid discussion a three stage strategy may be suggested for rural planning and development:

(a) Rural survey and resource appraisal :

It includes detailed survey of the region, its resources, socio-economic regional imbalances.

(b) Plan formulation and plan implementation :

Detailed plans should be prepared at gross root level in which central villages should be developed as the smaller unit of planning under the proper supervision from the block headquarters. Adequate Training should be imparted to village youths to run plan programmes which should attract maximum participation by local population.

(c) Plan evaluation and corrective measures :

There should be periodic review of the plan achievements and if need arises corrective measures should be adopted.

8.2 A MODEL FOR CENTRAL VILLAGE PLANNING :

Following these guidelines a model for central village planning may be adopted (Fig. 8.1A). Such villages play a key role in their neighbouring villages. They also act as the cells of modernization, promote new type of functional leadership, develop into store-house of information, radiate innovation at a much faster rate and distribute gains of planning to all sections of the people. The figure exhibits that six neighbouring villages (A) are depended on the central village (B) while latter is subservient to higher order centre at C for specialised higher order services. In land use model (Fig 8.1B) the direction of dependency

MODEL FOR CENTRAL VILLAGE PLANNING
(SCHEMATIC)

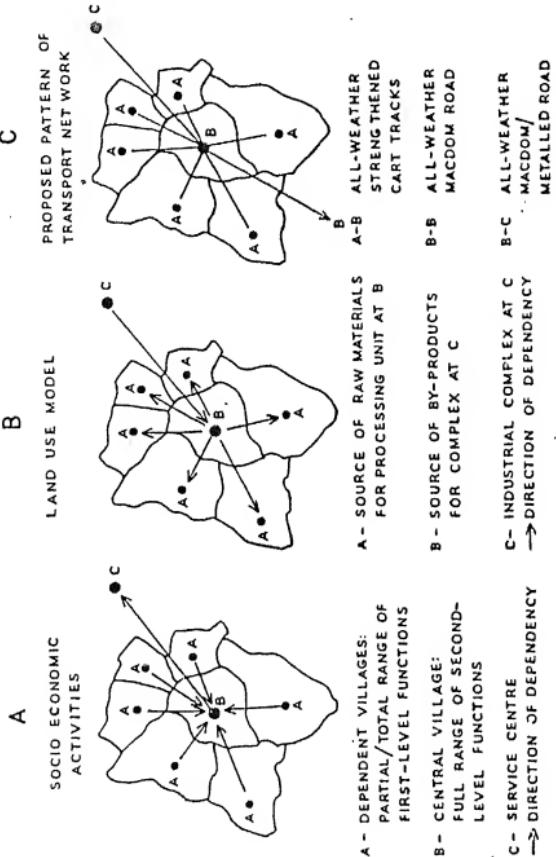


FIG. 8-1

has been changed under which the central village draws its raw material for its processing unit but sends its byproducts to the industrial complex situated at C (Fig. 8.1B). Figure 8.1C, showing transport network, displays that all the neighbouring villages are joined with the central village by means of all weather strengthened cart tracks while the central village is connected by all weather metalled road to the neighbouring centres of same order (B) or higher order (C).

(a) Lay out plan for a group of villages :

Following this proposition a layout plan for a group of villages (Imadpur, Karakka, Mohaddinagar and Aligarh) in Rajepur block has been prepared (Fig. 8.2). Covering a total area of 4.86 km^2 , in the north eastern part of the district, these villages are situated along the right bank of the Ramganga river while river Ganga flows at a distance of only 5 Km in the west. These villages are inhabited by a total population of 3517 persons comprising of 646 households and 528 houses (Table 8.K). Though these villages hold the best agricultural land, lying in between the two rivers, but the menace of floods and the lack of transport facilities have hindered the pace of economic progress. Consequently the area presents a typical example of backward economy lacking infra structural facilities for development. About 8.2% of the population

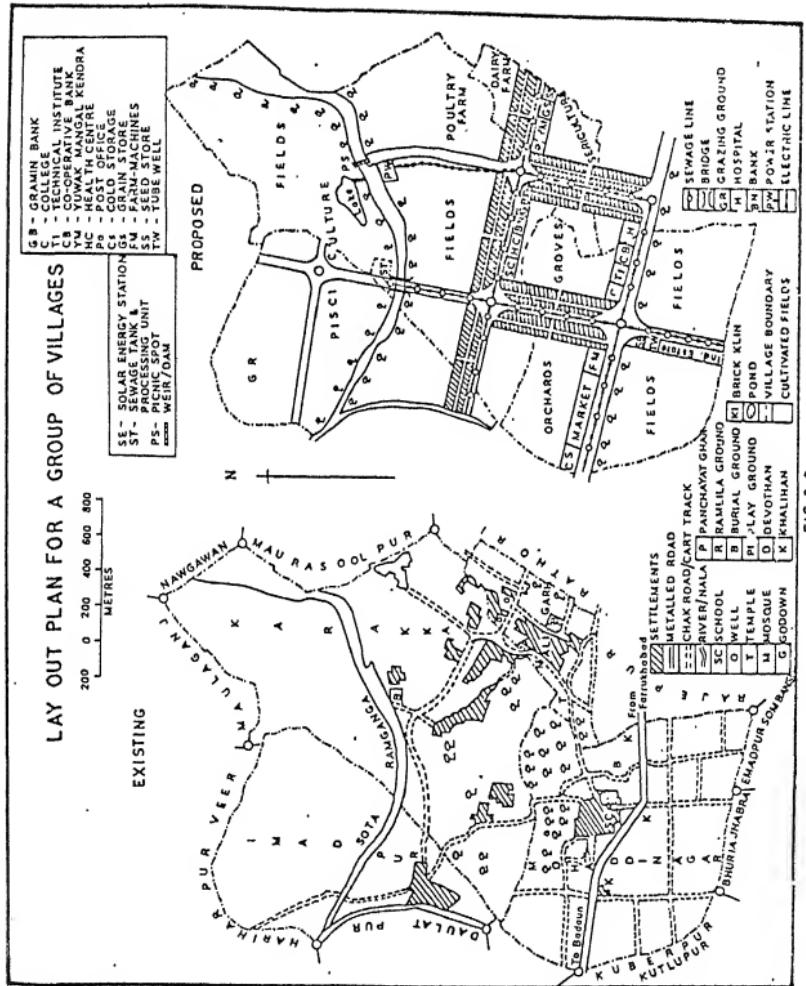


FIG. 8-2

TABLE 8.I
POPULATION CHARACTERISTICS OF SAMPLE VILLAGES

Villages	Area (acres)	No. of house holds	No. of resi- dental houses	Population		Percent of Population		
				1971	1981	Schedu- led castes	Liter- ates	Work- ers
Aligarh	34.8	210	171	881	1102	5.99	22.59	25.86
Mohaddi- nagar	140.8	55	40	255	312	0.00	23.39	27.56
Imadpur	99.9	95	95	452	571	2.98	20.49	29.95
Karakka	210.0	286	222	1289	1532	13.38	17.82	31.59
Total	485.5	646	528	2877	3517	8.19	20.24	29.17

belongs to scheduled castes who own very little proportion of village resources and are leading a pathetic life devoid of basic human facilities. The literates account for 20.24% of the total population (females literacy : 6.17%) while working force constitutes 29.17% of the same. This leads to high dependency ratio and serious problem of unemployment. Amongst the services available in these villages mention may be made of a junior basic school and a weekly market held on every Sunday at Mohaddinagar (Plates 4 & 5). Even Aligarh, which until 1925 was the headquarters of a tahsil, does not occupy the status of a 'nyaya panchayat' centre.

Though many cart tracks and 'Kachcha' roads pass through these villages, but the entire area emerges like pool of mud during rainy season through which transport is difficult. Infact many of such tracks change into 'nala's' joining the Ramganga during floods. Only one metalled road running from Farrukhabad to Budaun and passing through the southern part of the area is a all weather transport link to the region. The flood prone area of the north has direct bearing on the distribution of settlements, agricultural operations and means of transport and communication development. The flood has washed away several houses and people have been forced to move to safer places to build new colonies. That is why settlements are found in scattered patches in eastern and central parts of this area. In flood-prone areas Kharif Crops are invariably damaged and people have to rely upon the Rabi Crops whose sowing is often delayed making way for coarse grains.

Figure 8.2B displays the proposed pattern of land use for these villages keeping in mind their development needs. The entire land area has been so divided that 8-10 percent may be utilised for residential purposes, 8-10 percent for public utility services, 5-8 percent for industries, 15-20 percent for village groves, orchards and pastures, and remaining 50-65 percent for agriculture. All the village hamlets have been brought under compact site along the

newly laid roads and streets where proposal has been made to provide drinking water, electricity and sewer disposal. Similarly markets together with cold storage, college, technical institute, co-operative bank, hospital, solar energy station etc. have been proposed along the main road running from Farrukhabad to Budaun while industrial estate is located on the southern side. Health centre, junior basic school, banks, post office, yuval mangal kendra, panchayatghar, grain store and seed store have been located along the main thorough fare not very far off from the settlement sites. Sewage tank and sewage processing unit have been suggested in the southern side along the Sota Ramganga to guard against the environmental pollution. The river needs a bridge for better accessibility of the northern part. In order to give a face lift to this water logged area and enhance its contribution to rural economy a weir alongwith an artificial lake and power station have been proposed to be built near the river whose two banks should be strengthened by the planting of new trees. In order to diversify rural economy pisco-culture, poultry farming, seri-culture, dairy farming and fruit gardening should be encouraged and village youths should be provided adequate training for industrial and other jobs. Similar plans may also be formulated for different clusters of

villages after thorough study of their physical and cultural environs and personnels from development blocks should extend their helping hands to make the scheme a success.

To bring these proposals a concrete shape the entire shape the entire land resources of the component villages should be brought under the collective ownership of the central village council (Kendriya Gram Parishad) which should consist of five elected representatives from each village, a chairman and a village level officer who should be capable of providing guidelines for rural industries, agriculture, housing, health and sanitation. It should form five village councils (Gram Samitis) to supervise the development of rural agriculture, industries, housing, education and health. The Kendriya Gram Parishad should devise ways and means to provide employment and means of livelihood to every rural youth and impart them adequate education and training for the development of their personality. It should procure grants, subsidies and technical advice from government and private organisations for alround development of the villages. Besides introducing welfare schemes for providing cheap educational, medical, housing, transport and recreation facilities to village folk it should open consumer stores for providing consumer goods and necessities of life at cheaper rates.

Similar suggestions have also been made by Tiwari (1984, pp. 154-155) and Nizamuddin (1983, pp. 272), who

have also proposed for the cooperative management of the rural land and resources through five Gram Samitis constituted by elected representatives from each village.

(b) House Design Plans :

No improvement in the village sanitation is possible unless effective measures are taken to improve the layout and designs of the rural houses. Such houses which lack approach roads, water drains, sewerlines, windows, lavatories, ventilators, etc. need cautious planning on the lines suggested by Tiwari (1984 p.159) keeping in mind the owner's need, his economic and social status, construction cost, availability of building material, living space, technology, sanitation, etc. (Fig. 8.3A). Since rural dwellings need more space for storing food grains, agricultural implements, fodder and keeping cattle three separate plans of houses have been proposed keeping in mind the economic conditions of their inhabitants. Figure 8.3B, presents a model of two room houses with a total carpet area of 100 sq.metres (plot size of 250 sq.metres) with kitchen, bath and lavatory facilities. The three room house with slightly bigger area (plot size 300 sq.metres, carpet area 150 sq.metres) is meant for middle income group people (Fig. 8.3B). The plan for a four or five room houses occupies a total carpet area ranging from 250 to 350 sq.metres (Plot area being 500 to

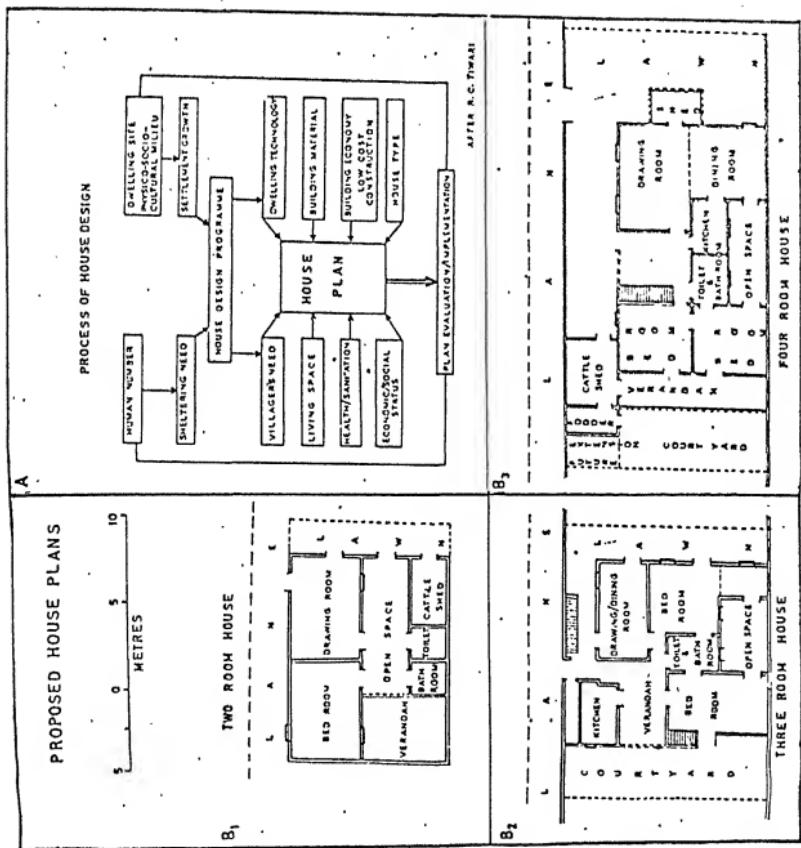


FIG. B.3

700 sq.metres) with provisions for courtyard, verandah, stairs, store, kitchen, bath, toilet, etc. (Figs. 3B). Such houses may be suitable for higher income group people who may make suitable modifications in the plans making way for Kitchen, garden, cattleshed, gobar gas plant, guest room etc. Since rural dwellings follow certain age old traditions and observe strong notion of family privacy, the layout of the rooms, courtyard, verandah, kitchen, toilet, cattleshed etc. Should be planned accordingly so that plans may get easy approved of the rural people.

Another important point to be noted in this connection is to bring down the cost of construction for which such organisations like Central Research Building Institute, Roorkee etc. should come out with new designs of the rural houses. The institute has devised ways and means to bring down construction cost by 20 percent (Saxena, 1976, pp.41-42) and also to design such houses which are within the reach of the economically weaker section of the rural society.

Following suggestions by Yadav and Verma (1979 pp.99-100) may be followed to minimise the cost of house construction in the study region.

Stabilized soil, puddled clayey soil mixed with water should be used in the 'Garbh' (foundation) of the Kutcha house while concrete (33% concrete and 5% cement) may be

utilised for pucca houses. Similarly stabilised soil with 5% lime or second class bricks with mud mortar may be suitable for the foundation of a mixed dwelling.

2. Stabilised soil with 3% liquid asphalt for outer walls and ordinary mud plasters for inner walls, or 5% bitumen emulsion with cowdung for water proof plaster may be used for wall plasters in rural houses.

3. Stabilised clayey soil or straw and thatched roofs coated with cement plaster with bitumen emulsion supported on the wooden frame may be used for Kutcha houses while roofs made of bricks or stone slabs covered with lime may be suitable for pucca houses.

4. The floor of a kutcha house may be constructed either with earth floor coated with cowdung or stabilised soil while twelve inches thick layer of stabilised soil and 2.5 percent cement may be utilised in case of mixed houses. In pucca houses cement plaster of 0.5 inch thickness above bricks laid on 3 inches thick lime may yield good results.

5. In the construction of upper stories of a house laying of earthen block with 5 percent cement in soil or walls of crushed earth and puddled clay mixed with water or asphalt stabilised bricks (soil with 0.5% liquid asphalt) for outer walls and unbaked bricks laid with mud-mortar

for inner walls may be used for Kutcha houses. Similarly pillars (12" x 12") made with stone blocks or bricks laid with lime mortar may be used for pucca houses.

Besides, Gram Samiti should construct cheap houses for marginal and land less farmers and allot them at minimum rates (1 or 2 rupees per day for 10 or 20 years) after obtaining grants and subsidies from government and private agencies. Loans and subsidies should also be given to individual farmers to encourage house building activities in rural areas.

8.3. RURAL DEVELOPMENT TYPOLOGY :

Planning programmes, if not undertaken judiciously, may lead to intra regional disparity and imbalance. Consequently one part of the region develops at a faster rate leaving behind other parts to develop slowly. In order to discern intra-regional disparities in Farrukhabad district a 'deviation system analysis' using 10 variables has been attempted. These variables include population density, population growth, literacy, female literacy, non-agricultural workers, workers engaged in house hold industries, villages with more than 2000 population, electrified villages, length of roads and use of fertilisers, etc. The regional mean (obtained after deducting the 1971 value from that of 1981) has been assumed as 1 and deviations give us the development index

TABLE 8.11
DEVIATION INDICES OF REAL DEVELOPMENT

Blocks	Pop. Density	Pop. Growth	Lite racy	Female lite racy	Non cultu ral work ers	House hold	Vill ages with 2000 pop	Ele ctric fied villa ges	Len gth of roads	use per till iers	Σ	Di average
Kaimganj	0.84	0.97	0.42	0.29	-0.88	-1.68	1.35	2.15	-0.13	1.60	4.63	0.46
Navabganj	1.09	1.09	1.04	1.04	-0.94	-2.25	2.20	3.12	1.58	2.24	10.21	1.02
Shamsabad	0.34	0.38	0.93	0.94	-3.23	-1.48	0.69	1.62	1.74	0.64	2.57	0.26
Rajepur	0.84	1.10	0.48	0.10	-1.24	-2.98	0.81	0.28	0.84	0.73	0.96	0.10
Baripur	0.33	0.23	0.58	0.54	-1.98	4.51	0.45	1.01	2.82	1.52	10.01	1.00
Mohammabad	1.43	1.45	1.30	1.31	0.07	-1.85	1.09	0.66	0.50	1.11	7.07	0.71
Ramalganj	1.31	1.13	1.04	0.96	-2.12	-2.05	1.31	1.02	0.71	1.67	4.98	0.50
Chhibranau	1.33	1.26	1.42	1.56	-0.19	-1.31	0.82	0.75	1.21	1.31	8.16	0.82
Talgram	0.86	0.71	1.07	1.06	-2.07	-16.79	1.09	1.36	1.29	1.35	-10.07	-1.00
Saurikh	1.05	1.12	1.39	1.54	1.39	4.21	1.02	0.52	0.21	-0.10	12.35	1.23
Haseran	0.91	0.99	1.40	1.36	0.87	-0.38	0.08	0.56	1.47	-0.15	6.61	0.66
Jalalabad	1.34	1.41	1.25	1.17	1.24	9.99	0.90	0.13	-0.50	-0.36	16.57	1.66
Kannauj	1.07	1.05	0.54	0.73	-1.65	1.53	0.05	0.57	0.55	2.34	6.78	0.68
Umarda	0.84	0.98	0.70	1.73	-1.59	-0.20	2.52	0.28	1.42	-0.11	6.57	0.66
\bar{X}	58	17.82	6.7	4.76	-0.35	-0.12	3.09	10.2	38	34.54		

(Di) (Table 8.II) whose spatial pattern has been analysed in figure 8.4. According to Singh et al this deviation system analysis not only helps in assessing the individual performance of every variable but understanding the pace of economic progress in the district. But in case of Farrukhabad district the upgradation of seven large villages in to urban areas has led to negative growth (during 1971-81) in respect of non-agricultural workers and house hold industries. However keeping the Di values in mind three types of growth trend may be analysed in the regions:-

(a) Fast Growth (Di > 1.00) :

It includes Jalalabad, Saurikh, Nawabganj and Barhpur blocks, covering an area of 864 sq.km. and supporting 22.15% of the total rural population of Farrukhabad district. Incidentally the former three blocks do not have any urban area within their boundary while Barhpur enjoys the advantages of district headquarter. Jalalabad and Barhpur have high transport accessibility. The remarkable progress in house hold industries in Jalalabad block is encouraged by the proximity of Kannauj and Gursahaiganj, the two main centres of small scale and cottage industries. These figures are also higher in Saurikh and Barhpur blocks where local markets are available for the small receptive to new agricultural innovations (use of fertilisers etc) besides having the largest number of electrified villages and

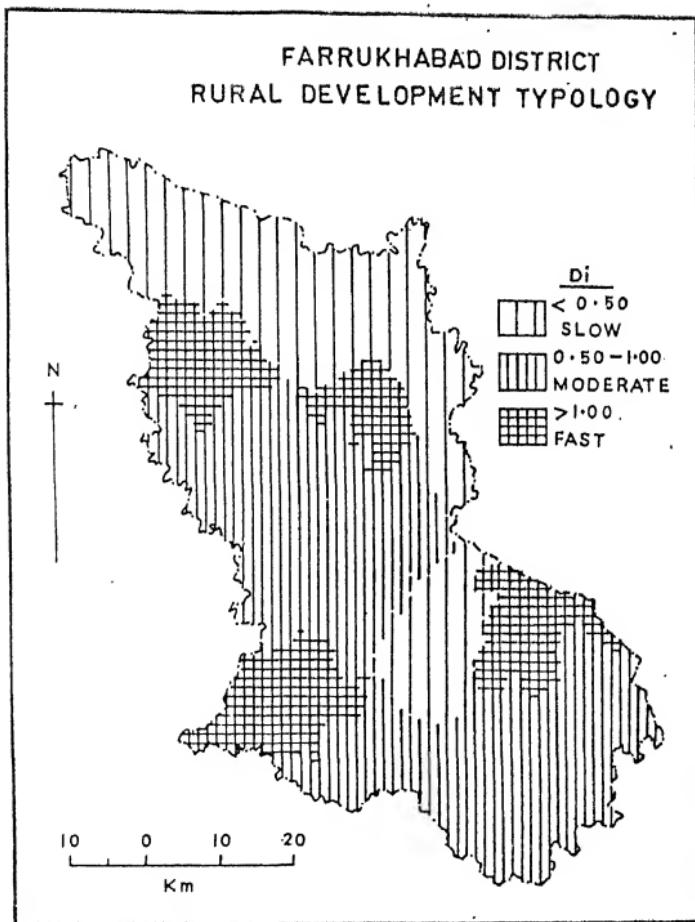


FIG. 8-4

length of roads. The indices in respect of population density, population growth and literacy rates are generally higher in these blocks (except Barhpur) enhancing the Di values.

(b) Moderate Growth (Di 0.5 - 1.0):

This covers six development blocks as Chhibramau, Mohammadabad, Kannauj, Umarda, Haseran and Kamalganj occupying a total area of 2104 sq.km. and supporting 49.62% of the region's rural population. Here faster growth of population due to inherent tendency of urbanization together with higher percentage of literacy have given boost up to development activities. Besides Kannauj tops among all the blocks in the use of fertilisers but household industries are directly serious attention of the government and people in recent years.

(c) Slow Growth (Di < 0.5):

It includes Talgram, Rajepur, Shamsabad and Kaimganj blocks - covering 1343 sq.km. of district's area and (sheltering) 28.23% of its rural population. The development activities in Rajepur, Shamsabad and Kaimganj blocks are very much restricted by the flood conditions and water-logging. The flood not only causes serious damages to crops, transport routes and inhabited sites (plates 26 & 27) but paralyses the whole regional economy at times leading to retrogressive

steps. The whole infrastructure has to be rebuilt after the recession of the flood. Also there has been substancial transfer of rural population due to the emergence of new towns in these blocks which has been responsible for negative growth trends in respect of non agricultural and house hold industrial works. In fact there has been a tendency of artisans, village craftmen etc. to migrate from rural areas to cities to search new employment or to switch over the farming etc. to earn their livings. The upgrading of a sizeable portion of population from rural (1971) to urban (1981) status in Kaimganj, Shamsabad and Talgram blocks is another factor related with negative growth trends in these blocks. The decrease in length of roads in Kaimganj block may be cited an example to illustrate this problem.

8.4 SPATIO FUNCTIONAL PLANNING :

The main objective of this planning is to provide adequate infra structural facilities all over the region to promote balanced allround development. Because it is not possible to house such central services in every village a hierarchy of service centres ranging from central village to regional city may be developed not only to provide services to their umland population but to help in disseminating new innovations and development programmes to the remotest village. Since the spatio-functional system of the region, as analysed in Chapter 7, is truncated

favouring the growth of such large towns which instead of promoting growth become parasitic in nature, it is essential to fill in the spatio-functional gaps and develop an integrated spatio-functional system.

There are 125 service centres in the district (Fig.7.1) majority of which are mere collection centres for agricultural raw materials and distribution centres for consuming goods to rural people. Some of them have administrative and semi-administrative functions like tahsil headquarters, block headquarters, police station, post office, co-operatives, etc. while others have educational institutions of different orders, markets, etc. A few have also been the traditional centres for cottage and village industries. These existing centres may provide base for developing new spatio-functional system and should be given due consideration in spatio-functional planning.

(a) Spatio Functional Gaps :

Location of the functional gap is the main exercise in spatio-functional planning which helps in completing the existing system of service centres. There are two methods, i.e., area and population served by each service centre which may be used for the purpose. In the study area the existing distribution of service centres (Fig.7.1) is uneven showing their concentration in some areas and vast unserved areas elsewhere. Also, there is lack of

sufficient number of service centres in the fourth and fifth orders whd play pivoted role in rural development and rural reconstruction. On an average each service centre in the region serves 13 villages or 34 sq.km. of area. In order to reduce the pressure on existing service centres there is a need to develop some new service centres in the region. Owing to the uneven distribution of service centres inter-centre distances exhibit great variations. That is why, in some areas service centres are quite closer to each other while elsewhere these are farther apart. Even if existing service centres are uniformly distributed the inter-centre distances ^{are} too large to promote growth activities. Hence an average distance of 4 km (pop. 6000-8000) for service cells, 8 km (population 10,000-20,000) for service centres, 15 km. (population 40,000-100,000) for growth points, 30 km. (population 2-4 lakh) for growth centres and 60 km. (population 15-25 lakh) would required 220 fifth order centres in the region by 2001 AD (Table 8.III). These figures when compared with the number of existing service centres (1981), and their probable growth by 2001 A.D. (Fig. 8.5) will give the actual number of service centres to be developed for promoting balanced rural development in the area. This suggests the development of new service centres, infilling the locational gaps and upgrading and sometimes even degrading the existing ones.

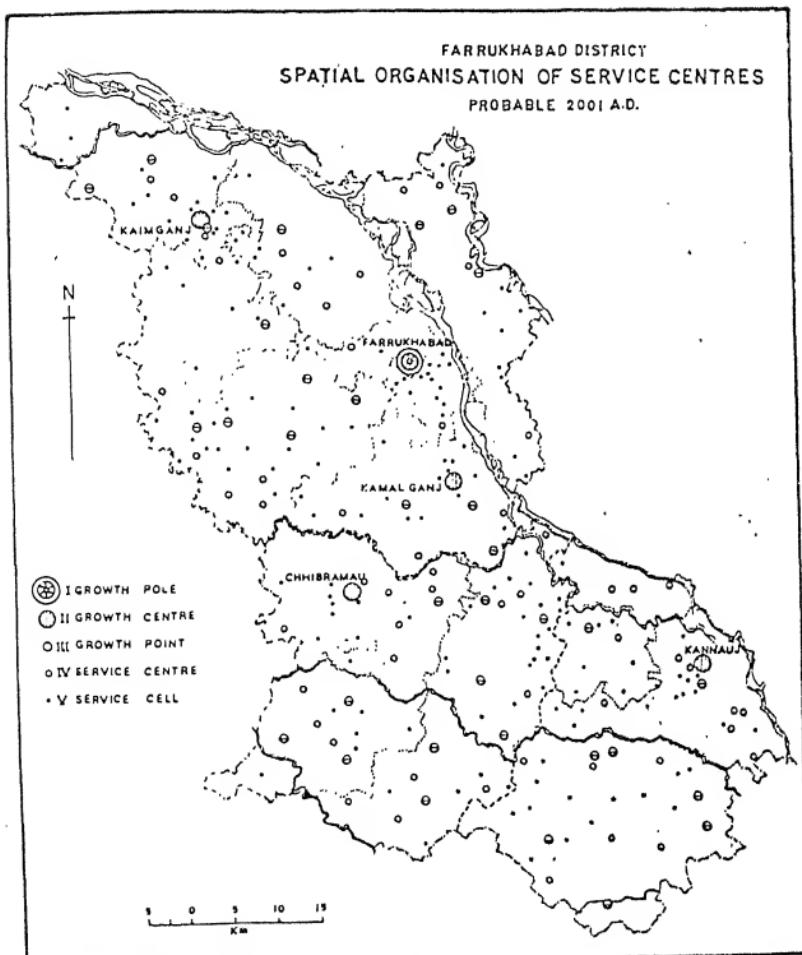


FIG. 8.5

Another method for indentifying the spatio-functional gaps is based on the population threshold which shows the minimum number of consumers needed to support a particular function (Bunge, 1962, p.142) in a service centre. This helps us in picking up such service centres which possess minimum population but are devoid of particular service or function. Using Reed-Muench method (Haggett and Guna Wardena, 1964,pp.6-9) population threshold for a number of central functions has been determined and such villages identified which need those functions.

TABLE 8.III
SERVICE CENTRES : PROBABLE & PROPOSED

Hierarchical order	No. of service centres			Required service centres by 2001 A.D.		
	Actual 1981	Hypo- theti cal	Probable 2001	No.	Distance (Km)	Population served
I Growth Pole	1	1	1	1	60	20,00000
II Growth Centres	4	5	4	4	30	3,00,000
III Growth point	11	19	34	20	15	70,000
IV Service Centre	15	26	57	55	8	15,000
V Service cell	94	217	164	220	4	7,000
Total	125	268	260	300	-	6,700

(b) Proposed service Centres :

Taking all these guidelines in mind the author proposes to develop 1 first order 4 second order, 20 third order, 55 fourth order and 220 fifth order service centres in the region (Table 8.IV, Fig. 8.6 and appendix III) by 2001 AD to rationalise the existing spatio-functional system and make it more growth propellent. This endeavour besides taking into account the existing pattern of service centres, their growth trends, spatio-functional gaps, transport accessibility, population projection and future demand of services, etc. emphasises the development of rural service centres at grass root level so as to achieve the goals of rural development. Such central villages should house basic services like senior basic school, branch post office, weekly market, rural credit society, rural health centre, request bus stop, stores for distributing improved seeds, fertilisers and pesticides, fair price shops, repairing shops for agricultural implements and farm machineries, etc., and should be developed as initial growth foci for the diffusion of innovations and development programmes. They should provide necessary guidance to dependent neighbouring villages with whom they should have easy accessibility through kachcha or pukka roads. Such central villages should be selected after a detailed survey of the entire region and care should be taken to provide them adequate infra-structural facilities. It would be better if a cluster of 5 to 8 villages is identified and a village cooperative is formed to supervise the judicious

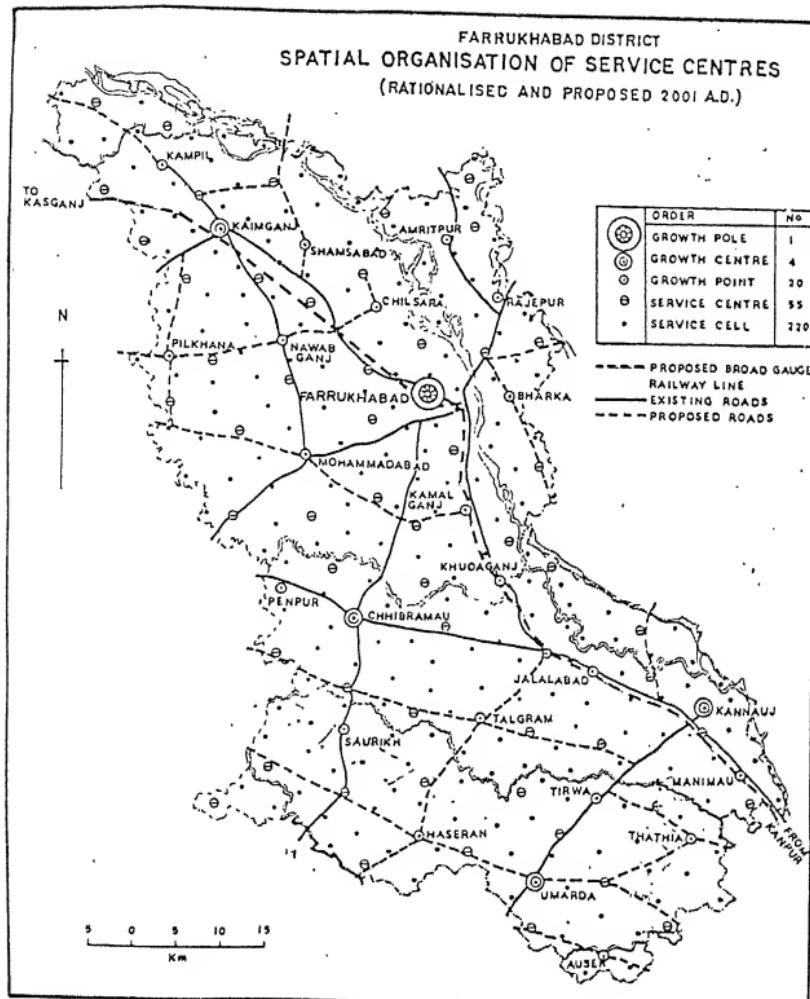


FIG. B-6

TABLE 8.IV
 SERVICE CENTRES : RATIONALISED AND PROPOSED .

Tahsil/ Region	Hierarchical order					Total
	I	II	III	IV	V	
Kaimganj	-	1	5	12	49	67
Farrukhabad	1	-	6	18	65	90
Chhibrampur	-	1	4	13	57	75
Kannauj	-	2	5	12	49	68
Total	1	4	20	55	220	300

utilisation of rural resources with special emphasis on eradicating problems like illiteracy, poverty and unemployment. In the initial stage the government should provide sufficient funds and supervise development activities and as experiment succeeds such centres should be made self reliant using local resources and raw materials. In Farrukhabad district 220 such centres have been proposed (Fig. 8.6 and Table 8.IV) majority of which are developing service centres housing one or two services and have played a pivotal role in erstwhile 'jajmani' system.

Next in hierarchy come 'nayaya panchayat' centres (service centres) which should be developed to house such

services like higher secondary school, rural polytechnic, sub-post office, rural dispensary with family welfare facilities, busstop, co-operative bank, rural industrial estate, bi-weekly market, animal husbandry sub-centre, general provision store, gramin bank, retail shops for fertilisers, pesticides, etc. These centres should command three to four central villages and may act as bridging link between the block headquarters and service cells. In the study area 55 such centres have been proposed majority of which belong to fifth orders of the existing pattern of service centres.

The third order (growth-point) service centres at block level should be developed to evolve as main focus for rural planning housing such facilities like degree college, technical institute, industrial training institute, hospital with operation theatre, post and telegraph office, telephone facilities, bus station, railway station, nationalised bank, veterinary hospital with artificial insemination facilities, tri-weekly wholesale market with chemist and druggist shop, medium industries, industrial estate, etc. They should provide adequate expertise in the fields of agriculture, industries, housing, transport and communication etc. and impart training to village youths for specialised jobs. They should not only provide guidance to lower order centres but monitor their development programmes so as to

suggest punitive measures. In Farrukhabad district 20 such centres have been proposed to be developed by 2001 A.D. of which nine are already block headquarters (remaining five upgraded); two newly developed urban centres while others have pivotal location to take up the supervisory status. The government should provide basic urban facilities at block-level whose headquarters should be invariably located in rural environment so that planning officer should get an opportunity to have a first hand information about the rural problems and their complexities.

The second order (growth centre) service centres at tahsil level have transitory role between the district headquarters and development blocks. These should be developed as full-fledged urban centres providing specialised services like postgraduate college, hospital, head post office, telegraph office, telephone exchange, transport depot, railway station, bank, marketing and industrial complexes, etc. and should be capable of taking additional burden from the district headquarters to avoid congestion and improve quality of environment. In the study area 4 such centres have been proposed three of which are still tahsil headquarters while remaining one has the pivotal location to take up the special supervisory role by the end of the present century.

The first order (growth pole) service centre occupying the district seat of administration should act as a bridging link between rural planning organisation at block level and government departments at State level. Steps should be taken so that all development programmes should be finalised at this level and adequate funds should be made available for their implementation. Besides issuing the policy guidelines for rural development such centre should also house central offices of banks, post office, public works department and administration. It should provide specialised services like T.B. clinic, eye hospital, leprosy centre, veterinary hospital, I.T.I. and centres for training, planning and government personnel. It should have full fledged urban facilities including planned area. The twin town of Farrukhabad-cum-Fatehgarh should be developed to take up this special job not only for supervising the development programmes in the entire district but also for attracting the entrepreneurs from congested cities like Kanpur, etc.

8.5 OTHER RECOMMENDATIONS:

The rationalisation of existing functional system cannot yield desired results unless effective steps are taken to improve means of transport and communication, power grids, irrigation and drinking water systems, health, banking and marketing facilities, etc. There is a need to convert existing metre gauge railway tracks into broad gauge linking

Kaimganj, Farrukhabad, Gursahaiganj, Kannauj (Sarai Miran) with Kanpur. The road beyond Gursahaiganj, linking Kaimganj, Farrukhabad, etc. with G.T.road, should be broadened to accomodate easy flow of passenger and goods traffic (specially potato). The road length in Jalalabad and Haseran blocks should be strengthened which own only 13 and 16 km. long roads at present, respectively. Similarly Kannauj, Farrukhabad and Kaimganj, etc. should be linked with a 220KV transmission line with several feeder lines to intermediate and minor towns to promote rural industrialisation as well as the power supply to the increasing number of cold storages in the district. There is a need to put more emphasis on the development of transport and communication lines in southern parts of Kaimganj Tahsil and Trans-Ganga region of Farrukhabad Tahsil.

The district is rich in agricultural resources and there is sufficient scope for developing agro-based industries such as potato based industries at Farrukhabad, Mohammadabad, Kamalganj, Kannauj and Chhibraramau; tobacco and fruit based industries at Kaimganj; Shamsabad, Kampil, Nawabganj and Gursahaiganj, ground nut based industries at Kannauj; Tirwa, Thatia, Talgram, Saurikh, Haseran and their neighbourhood, sugarcane based industries at Kaimganj and its neighbourhood. Similarly starch production plants at Farrukhabad, Kannauj, Chhibraramau, Mohammadabad, Kamalganj and Jalalabad utilising maize crops may meet local demands of cotton textile industry, while Vanaspati and Oil mills

utilising oilseeds may find place at Tirwa, Umarda and Saurikh. Cloth printing and scent industries have been the traditional and ageold industries of the region which should not only be modernized but should be given boost up to be spread up to neighbouring towns and villages. Other small industries like iron smithy, futniture making, flour grinding, bakery, corn flake making, vegetable and fruit preservation, soap, paint, varnish, chemical, dyeing, etc. should be promoted at nyay panchayat and central village sites to provide employment to rural youths.

Besides industries agricultural development should not leg behind. The region's rural population is expected to reach the staggering figure of 22.6 lakhs by the end of the present century. On one hand this rapid growth of population should be checked (out) by popularising the family planning programmes in rural areas while on the other, to feed the large population, new agricultural technology should be popularised for intensive farming, which could not only meet local demands but leave a sizeable surplus for agro-based industries. One of the measures to be adopted is to extend canal irrigation to various parts of the district under the extension scheme of Lower Ganga and Ramganga Canal systems. Alongwith agriculture, dairying, fish, poultry, duck-farming, seri culture, etc. should also be encouraged to supplement farmers income and to provide them off season employment.

In the district there is neither a degree college with science subjects nor any institution to provide technical education, even at diploma level, to the youths who want to make it their career. Attention should be paid to this side also. Apart from it, the mass education programme through adult education should be launched and awareness should be created amongst the rural folk regarding rural development programmes, improving quality of environment and, health and hygiene, etc. Ganga water should be tried to make pure by stopping the 'nalias' falling in to it at various places throughout the region. Vigorous campaign should be launched to uproot social evils like caste-system, child-marriage, dowry, bonded-labour, child-labour, drug addiction, etc. so that economic and social conditions of the village folk could be improved. Administratively to associate this district with Bareilly region, in place of Allahabad, will not only reduce the distance between the district and regional headquarters, from 340 km. to 125 km., but will also effect the smooth running of plans and projects guided by regional headquarter. The rural areas of the study region have vast biotic and abiotic resource potentials whose judicious utilisation and proper administration will undoubtedly bring prosperity to the district and improve the quality of life of its inhabitants, 'inshaallah'.

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SUMMARY AND CONCLUSION

Farrukhabad district ($26^{\circ}45'45''$ N- $27^{\circ}42'45''$ N. Lat. and $79^{\circ}10'45''$ E- $80^{\circ}6'E$. Long), occupying the Central part of the Ganga-Yamuna Doab, is located on the north-western corner of Allahabad division. It is a medium sized district covering a total area of 4349 km^2 which is divided into 4 tehsils, 14 community development blocks, 168 Nyaya Panchayats, 1209 Gram Sabhas, 1771 fillages and 11 urban centres. The district is a level plain formed by the alluvial deposits of the Ganga and its tributaries. The general slope of the area lies from north-west to south-east at an average rate of 20 cm/km. The whole district may be conveniently sub-divided into two physiographic regions : (1) The upland plains comprising of the northern, western and southern part and incorporating 80% of the district's area, (2) The Low lands known as 'Khadar' or 'Tarai' lies within the flood-reach of the rivers and is enriched by the fresh deposits of silts every year. The Ganga and its tributaries like Ramganga, Burhiganga, Kalinadi, Isan, Arind and Pandu, etc. form the main drainage channel flowing in south-easterly direction. Apart from rivers numerous lakes and jhils are also found in the usar tracts of Kaimganj and Chhibrampur tehsils where the drainage is poor and water logging is common during rainy season.

The region enjoys tropical monsoon climate characterised by cool and dry winter (November to February), hot and oppressive summer (March to Mid June) and pleasing rains (mid June to October). The soils ranging from loam, clay and bhur fall under four broad types : (i) recent alluvium, (ii) flats, (iii) uplands, and (iv) lowlands. The natural vegetation has almost disappeared due to human interference and net cropped area to day occupies 65.5 per cent of the district's area. Forests, groves and pastures contribute 4.2% while 5.2 percent of the land is barren and uncultivable. About 70 per cent of the cropped area is devoted to staple crops like wheat, maize, rice, millet etc. But unlike other parts of the Doab the district is also famous for cash crops like potato, sugar cane, tobacco, ground nut, etc. Farrukhabad district has the larger number of private tube wells (378 government and 29,837 private tube wells) which together with canals and wells irrigate 62.6 percent of the total cultivated area of the district.

Farrukhabad is well served by means of transport and communication lines. It has 670 km. of metalled road giving an average of 155 and 48 km of road length per thousand square kilometers of area and per lakh of population respectively. It has two railway loop lines : (i) metre gauge running from Kanpur to Kaimganj (118.4 km), and (ii) broad gauge from Farrukhabad to Shikohabad (27 km) which are

insufficient to handle goods and passenger traffic. Over 54 percent of the villages of the region are electrified. The co-operative sugar factory at Kaimganj is the only large scale industrial unit, while calico cloth printing at Farrukhabad, scent making of Kannauj, bidi manufacturing of Gusahaiganj, Shamsabad and Tirwa, fruit preservation unit at Pitaura and a newly setup cotton mill at Sikandarpur (near Kampil) are other industrial establishments.

The first census of Farrukhabad district was taken in 1845 when its total population was enumerated as 696,741. The district has witnessed three distinct phases of population growth since 1901 onwards : (i) negative growth between 1901-21, (ii) slow growth rate between 1921-41, and (iii) phenomenal growth since 1941 onwards. The rapid rise in population during last 40 years may be attributed to significant improvement in health and sanitary conditions and safeguards against floods and droughts. Chhibrampur tahsil records the highest net increase (137.13% between 1872-1981) and annual rate of increase (0.75) while Farrukhabad tahsil occupies the lowest position (89.52% and 0.57% respectively). The region has a high variability index (33.63%) owing to fluctuating growth rates during different censuses. Assuming present growth rates the district's rural population is expected to reach the staggering figure of 22.6 lakhs by 2001 A.D. The population potential

shows a major peak around the twin town of Farrukhabad-cum-Fatehgarh while the arithmetic density is maximum in Barhpur block (512 persons/Km²). The fertility of soils, accessibility through means of transport and communication and proximity of urban centres have played significant role in augmenting the population density.

Working population constitutes 28.93% of the total rural population of which 98.04 percent is male. About 90 percent of the workers are engaged in agriculture and allied activities (cultivators 7%, and agricultural labourers 10.23%). The entire rural community consists of over 80 Hindu and Muslim castes of which Ahir, Chamar, Brahman, Kachhi, Rajput, Kisan, Lodh and Pathan are most numerous, Hindus are the most dominant religious communities (88.8%) followed by Muslims (11.09%). The sex ratio is in favour of males (783 females/1000 males) who are more literate (40.79%) than their female counterparts (16.07%). In recent years a menacing trend of migration from rural to urban areas has been noticed which is a matter of great concern to our planners and administrators.

Farrukhabad district is one of the early settled parts of the country. It has long chequered history right from the days of Mahabharat War. A number of Kheras are scattered over the entire region which need excavations on scientific lines. The region was earlier settled by Mesolithic hunters who migrated to the area from the

Vindhyan region. They were succeeded by Proto-Australoids and Dravidians. Aryans drove out these early settlers and founded large number of villages along the bank of the Ganga and its tributaries. Vedic rishis with their Ashrams along the river banks or inforested tracts played significant role in the propagation of the Aryan culture and thoughts. Prior to the beginning of the Buddhist period the study area formed part of the Panchala Janpada with its Capital at Kampilya. Later on it was merged into the Magadh kingdom. With the fall of the Gupta empire the district formed part of Harsha's kingdom with its capital at Kanyakubja (Kannauj). Harsha was a great monarch and during his reign the imperial city of Kanyakubja rose to its zenith. After his death in 648 AD anarchy prevailed till the formation of the Gaharwar dynasty (in 1090 AD) whose last ruler, Jaichand, was defeated by Shahabuddin Ghori in 1193 A.D. Jaichand was the last Hindu King of the region who not only brought prosperity and peace to the district but invited many Rajput clans from outside to settle therein. During Muslim rule Kannauj became headquarters of a division (Sarkar) under the suzerainty of the emperor of Delhi. With the emergence of the Bangash power the seat of government was shifted to Farrukhabad and many new towns and villages were founded sometimes as a consequence of religious persecution. The district was annexed to the British empire in 1802 restoring the sense

of security, discipline and peace and promoting the growth of new settlements. The process was further accelerated, after independence due to planned development leading to socio-economic development and improvements in hygienic and living conditions. The study of place names, spatial diffusion of Rathor Rajput clan settlements and colonization process in Mohammadabad Pargana based on field-work has revealed interesting details regarding the actual settling process and its phases in the region.

The general distribution of rural settlements is uniform except at some places where fertility of soils, proximity of rivers, occurrence of (USar lands, cropping pattern, urban centres, transport and communication etc. have caused local variations. Out of 1771 villages 1577 are inhabited giving a per village area of 2.43 km^2 and population size of 923 persons. Barhpur block has the smallest size of the villages in terms of area (1.56 km^2), while Rajepur block ranks lowest in terms of population (612 persons). The region is dominated by small sized villages 60% of which have less than 2 km^2 of area or 70% have less than 1000 persons per village. The district has an average density of 41 villages/ 100 km^2 of area and an average inter village spacing of 1.68 km. Lowest spacing (1.34 km)

has been found in Barhpur block whereas Umarda block exhibits the highest value (2.39 km). The nearest neighbour analysis shows a clear tendency towards regularity, the RN values ranging between 1.122 (Jalalabad block) and 1.287 (Saurikh block) and the values of the expected mean (r_E) being always higher than the variance (V). Settlements of the district have been grouped under three main types: (1) Compact settlements along the river banks and around the old sites, (2) semi-compact settlements in densely populated central part and along the transport routes, and (3) hamleted settlements in the southern part of the study area.

Villages of the study area generally consist of clusters of houses linked with Kachcha or pukka roads/footpaths and surrounded by cultivated fields all around. At times there are more than one inhabited sites within the territorial limit of the village, the main site occupied by the early settlers and high castes while hamlets are inhabited by the service castes and later immigrants. The inhabited sites are surrounded by multi-cropped best soil zone with decreasing soil values towards the periphery.

The average village-farm distance is 838.3 m with its maximum (1196.9 m) and minimum (670.8 m) values occurring in the Umarda and Barhpur blocks, respectively. Field sizes are small showing rectangular or square patterns. Major portion of the village land is owned by high castes like

Rajput, Brahman, Kayastha, Saiyed, Pathan, etc., while low castes and untouchables like chamar, Pasi, Dhanuk, Banjara, Mehtar, Musahar etc. are generally land-less labourers and lead a miserable life. Middle castes like Ahir, Kisan, Lodh, Kachhi, Kurmi etc. are gradually improving their land holdings due to new purchases from high castes.

The socio-spatial structure of four sample villages of the study-area has been analysed through religio-ritual and secular dominance models of Prof. K.N.Singh (1972). It has been found that high castes and land lords who own lion's share of village property occupy the best site for their residences, while service castes have peripheral locations. Untouchables and scheduled castes mainly reside in separate hamlets segregated from the main village through groves, usar lands, tanks or lanes. However due to increasing pressure of population and changing socio-economic conditions the physical distance between high and low castes is gradually disappearing and, in some cases, scheduled castes have even better living conditions than the higher castes.

The shape analysis of the villages of the study region has been attempted both qualitatively and quantitatively. Majority of the villages have rectangular or square shape, because about 60% of sample villages have shape indices between 0.3 and 0.7 and contact number between 4 and 7. Three sample areas with varying environme-

ntal conditions have been selected for the transformation of village-shapes using Thiessen's polygons and hexagons of different k values, so as to develop them viable units for planning and rural development.

There are 260,043 rural houses (1981) in the region giving an average density of 60 houses/km², 165 houses/village or 93 houses/100 households. The distributional pattern, more or less, follows the same trend as that of rural population with the highest and the lowest values occurring in Barhpur (81 houses/km²) and Rajepur (50 houses/km²) blocks respectively. Majority of the rural houses are built by using such local building materials which are available in plenty and at a cheaper rate. That is why mud and clay as wall (and) roofing material are used in about two-third of the rural houses. Typical features of the rural dwellings include rectangular plan, courtyard, outer and inner verandahs, flat clay roofs, kothas or patans, Kachcha floor, etc.

House types of the district have been classified on the basis of their building materials, size and shape, socio-economic status, functional characteristics and three broad regional types (1. Mud wall flat clayey roofs, 2. Brick wall puckka roofs, and 3. Wattle Wall thatched roofs) have been identified. Overall living conditions in

the rural houses are poor due to their haphazard pattern, absence of broad lanes, drainage, sewer, sanitation, and ventilation,etc. Majority of houses have no lavatory facilities and chimneys for smokes. Also there is acute congestion found in the rural dwellings (66% of rural house holds live in one or two-room houses). Similarly there are three blocks where at least 10 percent rural families are deprived of housing facilities.

Based on 5 major service groups (a.education, b. medical, c. transport and communication, d. trade and commerce, and e. administration) along with persons engaged in tertiary activities as percent of total working population, 125 service centres of various orders have been identified in the study area. The centrality scores of these service centres range from 1.13 (Disrapur) to 358.16 (Farrukhabad-cum-Fatehgarh). There is strong positive correlation ($r = + 0.8700845$) between centrality score and population-size and the break-points in score values have been used for classifying service centres into 5 hierarchical orders: First order (1), second order (4), third-order (11), fourth-order (15) and fifth order (94). The spatial pattern of service centres show their maximum concentration along the transport routes, near the urban centres or seats of administration and in the areas of good agricultural harvests. The R_N values for service centres show clear tendency towards

regularity ($R_N = 1.955$), with ofcourse random tendency apparent in fifth order centres ($R_N = 0.939$). The observed mean inter-centre distance comes to 5.74 km which is less than the hypothetical distance of 6.31 km observed under the hexagonal system. While Farrukhabad-cum-Fatehgarh has full control over the regions area, amongst second-order centres it controls the largest tributary area (1147 km^2) followed by Kannauj (1012 km^2), Chhambrau (958 km^2), Kaimganj (756 km^2), and Kamalganj (438 km^2).

In the last chapter based on the outcome of the development programmes areas of fast, moderate and slow growths have been identified in the district. A model for central village planning has been proposed and a layout plan for a group of villages has been prepared which recommends placing of entire village land under the direct supervision of central village council and formation of 5 gram samitis (Krishi, Udyog, Bhawan, Siksha and Swasthya) to promote all round development of the rural areas on co-operative basis. Three sets of house plans: 2-room (250 m^2), 3 room (300 m^2) and 4-room (500 m^2) have also been proposed for low, middle and high income group people for improving rural housing conditions in the region and various guidelines have been suggested to bring down the cost of construction and improve durability of houses as per recommendations from the Central Building Institute,

Roorkee. In order to fill in the gap and rationalise the existing Spatio-functional system 1 first order 4 second-order, 20 third-order, 55 fourth-order, and 220 fifth order service centres have been proposed to be developed in the region by 2001 A.D. Similarly certain guidelines have also been given to streamline the present transport and communication system, or improve the condition of agriculture and industry in the district to realise the goals of rural development.

These deliberations lead us to draw following conclusions ~~in~~.

1. Farrukhabad district, in fertile Ganga plain, is gifted with rich agricultural resources, but lags behind in industrial development.
2. It is a densely populated region characterised by fast growth rates and various problems like over population, unemployment, illiteracy, poverty, etc. Rural Society is a simple and tradition bound where untouchability, caste system, purdah system, dowry system, child marriage etc. are some of the old decaying notions still reigning supreme.
3. The region has a rich cultural background and long settlement history characterised by several phases of settlement growth and retrogression. The last

phase has begun with the arrival of many Rajput clans during medieval period who established the critical nodes of the present day settlements by exterminating aborigines like Meos and Bhars.

4. The location, distribution and types of rural settlements are mainly determined by physico-cultural factors with apparent dispersal tendencies and regular pattern in recent years.
5. The field pattern and villages shapes exhibit rectangular pattern whereas socio-economic factors including jajmani system play major role in determining the interior morphology of the villages.
6. Majority of the rural dwellings use cheap local materials without proper planning for roads, streets, drainage lines, windows, ventilators, toilet facilities etc.
7. The study area has a five-tier system of service centres whose distribution is very uneven and shows many spatio-functional gaps.
8. There is an urgent need to give rural bias to planning programmes which should be chalked out by the rural people for ameliorating suffering and poverty in these areas through the optimum utilisation of their resources. A model for cluster planning and evolving

an integrated spatio-functional system may suit the purpose.

Above findings lead us to approve all hypotheses mentioned earlier in the introduction of this monograph. It also gives us sufficient insight to study rural problems and settlement system in a micro-regional unit primarily based on field-work. This will not only help us in understanding the cultural history of a region but suggest ways and means to dense strategy to remove the pitfalls of our planning and accelerate the growth trends to achieve the cherished goals of rural development where society is free from tyranny and injustice.

APPENDIX I

FARRUKHABAD DISTRICT AREA, POPULATION & NUMBER OF VILLAGES, 1981

Sl. No.	Block	Area km ²	Number of inhabited Houses	Rural Population			No. of Villages Inhabited Uninhabited	
				Males	Females	Total		
1.	Kaimganj	366	20140	20789	66636	53753	120389	150 27
2.	Naabganj	231	14737	14965	4961	39797	89758	88 2
3.	Shamsabad	348	18555	19478	62493	50090	112583	147 28
	Tah.Kaimganj	945	53432	55232	179090	143640	322730	385 57
4.	Rajepur	342	17099	18689	56595	45083	101679	131 35
5.	Barhpur	159	12934	14138	45683	35795	81478	87 15
6.	Mohammedabad	413	25924	27233	90367	74742	165089	119 3
7.	Kamalganj	331	24027	25568	82152	69277	151429	159 26
8.	Tah.Farrukhabad	1245	79984	85628	274778	224897	499675	496 79

Appendix I contd.

8.	Chhibramau	324	21327	21785	73711	61317	135028	129	3
9.	Talgram	287	19427	22107	68541	58095	126636	99	4
10.	Saurikh	262	14691	16369	53459	44026	97485	95	1
11.	Haseran	212	11026	12315	39272	32573	71845	56	1
	Tah. Chhi- bramau	1085	66471	72576	234983	196011	430994	379	9
12.	Jalalabad	212	14981	16001	50756	42520	93276	77	16
13.	Kannauj	288	17990	19255	61733	51183	112916	132	33
14.	Umarka	536	27185	29372	96359	78315	174674	108	-
	Tah. Kannauj	1036	60156	64628	208848	172018	380866	317	49
DISTRICT FARRUKHABAD		260043	278064	897699	736566	1634265	1577	194	

Sources: Zila Jangarna Pustika, Farrukhabad, 1981, Santhkiye Patrika Jampad Farrukhabad, 1985.

APPENDIX IIRURAL SERVICE CENTRES : POPULATION & CENTRALITY SCORES

Sl. No.	Rural Service Centres	Population 1981	Centrality score	Tahsil
<u>IST ORDER</u>				
1.	Farrukhabad-cum-Fatehgarh	160,796	358.16	
<u>IIND ORDER</u>				
1.	Kannauj	41,016	150.47	KNJ
2.	Kaimganj	20,528	137.24	KMG
3.	Kamalganj	8,788	136.63	FRK
4.	Chhibramau	23,263	131.74	CHB
<u>IIIRD ORDER</u>				
1.	Gursahaiganj	18,250	91.23	CHB
2.	Mohammadabad	12,224	87.86	FRK
3.	Shamsabad	14,919	72.86	KMG
4.	SAURIKH	5,710	72.14	CHB
5.	Talgram	7,042	69.97	CHB
6.	Jalalabad	4,159	62.69	KNJ
7.	Umarda	3,541	57.34	KNJ
8.	Rajepur Rathori	2,147	54.29	FRK
9.	Ganipur Jogpur	4,674	53.49	KMG
10.	Tirwaganj	10,038	53.47	KNJ
11.	Sarai Miran	607	50.37	KNJ
<u>IVTH ORDER</u>				
1.	Kampil	4,534	45.37	KMG
2.	Haseran	1,874	43.24	CHB

Appendix II contd.

3.	Thatia	8142	39.32	KNJ
4.	Sikahdarpur	5698	36.37	CHE
5.	Sakhrawa	4735	36.33	CHE
6.	Girdkaimganj	1136	31.20	RMG
7.	Khudaganj	1991	26.30	FRK
8.	Rajipur	2506	26.30	FRK
9.	Siroli	11155	23.68	FRK
10.	Pipargaon	7105	23.39	FRK
11.	Nibkarori	3373	22.51	FRK
12.	Kharini	3289	22.49	CHE
13.	Jahanganj	2280	22.24	FRK
14.	Amritpur	3812	21.61	FRK
15.	Sarai Prayag	2994	21.45	CHE
<u>VTH ORDER</u>				
1.	Khairnagar	3894	19.45	KNJ
2.	Kasawa	4090	19.39	CHE
3.	Samdhin	9269	19.38	CHE
4.	Fatehpur	4683	17.40	KNJ
5.	Teramallu	1403	17.12	KNJ
6.	Yaqootganj	5584	16.71	FRK
7.	Tera Jakat	2514	16.37	CHE
8.	Tajpur	1552	16.12	FRK
9.	Manjhana	2945	15.52	KMG

Appendix II contd.

10.	Tajpur Naukasht	220	15.13	KNJ
11.	Salempur	1431	14.20	FRK
12.	Sakatpur	1200	14.07	CHB
13.	Pura Rai	3903	13.81	CHB
14.	Bhatasa	2657	13.26	KMG
15.	Raipur Khas	3791	12.53	KMG
16.	Pitaura	2367	12.28	KMG
17.	Akbarpur	2473	12.28	CHB
18.	Chandarpur Banjar	1812	12.17	KNJ
19.	Jagatpyr	2390	12.15	CHB
20.	Paraur	2606	12.15	CHB
21.	Chiyasar	1854	12.10	CHB
22.	Manimau	1246	12.06	KNJ
23.	Khimsepur	3125	11.19	FRK
24.	Bishungarh	5079	10.59	CHB
25.	Mirapur	2692	10.30	FRK
26.	Kuiyan Khera	1175	10.26	KMG
27.	Aligarh	1102	10.16	FRK
28.	Dheerpur	2551	10.13	FRK
29.	Rajpur	1709	10.08	CHB
30.	Roshanabad	2282	9.46	KMG
31.	Agos	3826	9.39	KNJ
32.	Jeonta	1585	9.24	FRK
33.	Kisrauli	1475	9.13	KMG
34.	Manjhpurwa	5259	8.40	CHB
35.	Bahawalpur South	2895	8.37	KMG

Appendix II contd.

36.	Udhampur	1721	8.35	CHB
37.	Ataipur Jadeed	3813	8.22	KMG
38.	Bishunpur Harilpur	2134	8.22	CHB
39.	Ghouspur	1395	8.22	FRK
40.	Sahipur	1788	8.16	KNJ
41.	Khadauli Hathi	2156	8.15	FRK
42.	Bankati	1179	8.12	FRK
43.	Bangawan	5314	7.54	CHB
44.	Tera Rabbu	1991	7.39	CHB
45.	Burhnamau	1726	7.2	FRK
46.	Jafarabad	2506	6.61	CHB
47.	Nigoh Khas	1467	6.49	CHB
48.	Bara Kesho	3303	6.22	FRK
49.	Bhojpur	1846	6.19	FRK
50.	Bargawan	2023	6.18	CHB
51.	Barjhala	1720	6.17	KMG
52.	Bharkha	1296	6.11	FRK
53.	Rajepur Sarai Meda	2967	5.92	FRK
54.	Maseni	2126	5.72	FRK
55.	Muraiya Brzurg	2187	5.41	KNJ
56.	Yousufpur Bhagwan	1537	5.36	KNJ
57.	Sheikhpur Khajoori	1171	5.29	FRK
58.	Mehanpur	1675	5.20	KNJ

Appendix II contd.

59.	Barai	1331	5.17	KMG
60.	Narenamau	2749	4.82	KMG
61.	Malikpur	2350	4.47	CHB
62.	Chilauli	2689	4.29	KMG
63.	Salempur Pashchim	1449	4.18	CHB
64.	Mahmudpur Khas	1535	4.16	CHB
65.	Anti	1248	4.15	KNJ
66.	Turk Lalai	1475	4.15	KMG
67.	Amethi Jadeed	2239	3.60	FRK
68.	Bhopal Patti	1756	3.17	FRK
69.	Dundwa Buzurg	4802	3.17	CHB
70.	Ismailpur	5197	3.15	CHB
71.	Mahoi	1376	3.12	FRK
72.	Uncha	3672	2.95	CHB
73.	Dhansua	1885	2.62	FRK
74.	Junedpur	1522	2.55	CHB
75.	Sheikhpur Rustam	2732	2.48	FRK
76.	Kutulpur	1580	2.46	KNJ
77.	Larhpur	1818	2.39	CHB
78.	Mehrupur Sehju	1603	2.20	FRK
79.	Rampura	1245	2.16	FRK
80.	Muran	1182	2.10	FRK
81.	Tharra Shadinagar	1026	1.70	KMG
82.	Khande Dewar	1678	1.68	CHB
83.	Nizam Uddinpur	1153	1.50	KMG

Appendix II contd.

84.	Dilawal	2807	1.47	FRK
85.	Azizalpur	1900	1.37	FRK
86.	Papiapur	2609	1.35	FRK
87.	Gadanpur Deorajpur	2624	1.30	FRK
88.	Guzarpur	1022	1.30	KMG
89.	Sakrahni	1418	1.28	CHB
90.	Panchrauli	1419	1.25	KMG
91.	Nasrapur	1115	1.23	KNJ
92.	Narayanpur	1535	1.23	FRK
93.	Sota Bahadurpur	1163	1.14	FRK
94.	Disrapur	1123	1.13	KNJ

APPENDIX IIIPARRUKHABAD DISTRICT SERVICE CENTRES : RATIONALISED
AND PROPOSED, 2001 ADI Order :

Farrukhabad cum Fatehgrah.

II Order :

Chhibramau, Kaimganj, Kannauj, and Umarda.

III Order :

Auser, Amritpur, Bharka, Chilsara, Haseran, Jalalabad,
Kampil, Kamalganj, Khudaganj, Manimau, Mohammadabad
Nawabganj, Penpur, Pilkhana, Rajepur, Saurikh, Shamsabad,
Talgram, Thatia, Tirwa.

IV Order :

Bahbalpur, Barabikeo, Barai, Kurar, Kunwa Kherha,
Manjhana, Raipur Khas, Rashidabad Brahmanan, Rudain,
Shahpur, Shareefpur Chhichni and Turk Lalai, (all
from Kaimganj tahsil); Amaliapur, Baron, Gadampur
Turra, Jahanganj, Jhasi, Kankapur, Karanpur, Kharhauri,
Kuberpurghat, Madanpur, Mahoi, Merapur, Nibkarori,
Pipargaon, Puthri, Saraha, Shringi Rampur and Yagootganj
(all from Farrukhabad tahsil); Amolar, Behta Khas,
Bishungarh, Chiya Sar, Dadona, Erahim Gursahaiganj,
Jafarbad, Kharini, Nademau, Panthara, Sakhrawa, and
Sikandarpur (all from Chhibramau tahsil) Bahosi,
Balampur, Basta, Belamau, Chandapur Bangar, Gangemau,

Gudhni, Khairnagar, Khanpur, Sarai Miran, Singhpur and Tira Mallu, (all from Kannauj tehsil).

V Order :

Ataipur Jadeed, Aera Baqipur, Barhagaon, Barkherha, Banskherha, Bichauli, Behtaballu, Bhatasa, Bhidaur, Burhampur, Chandpur, Chandpur Kachh, Dharrashadinaur, Eklehra, Fareedpur Manglipur, Gathia Haibatpur, Goojarpur, Guteti Dakkhin, Guthna, Jhabbupur, Kanasi, Karab, Khurhna Dhamgawan, Mooserpur, Mudaul, Nagla Nanan, Nagla Basola, Nasrullahpur, Narnaman, Naugaon, Niyaatpur Dhilawali, Parchroli, Pathramain, Qamaruddinpur, Rasheedpur, Roshanabad, Salempur, Shahipur, Shah Alampur, Shakrullahpur, Sikandarpur Agoo, Sikandarpur Khas, Silsanda, Siyani, Sojankipur, Sultapur, Sultanpur Khareta, Ugarpur, Umarpur (all from Kainganj tehsil), Arrahpaharpur, Ahilamai, Ahmadpur, Allahdadpur, Amethi Jadeed, Barhakesho, Banthal Shahpur, Bhadausa, Bhojpur, Bholepur, Bithai, Chiriyamuhuliya, Chunupur Gadiya, Darora, Daryapur Husainpur, Daulatpur Chakai, Dheerpur, Diosi, Husainpur, Durgpur, Gandhi, Gopalpur, Gesarpur, Gudera, Gutasi, Jaitpur Jainapur Maheshpur, Kanhepur, Katri Bhimpur, Katri Gangpur, Katri Sunderpur, Katri-Bidranagarhiya, Khimsepur, Kirachah, Kumhraur, Kuberpur Kuthupur, Lahuamannpatti, Maudha, Nagla Bagh Rathora, Nagla Durga, Nagla Hoosa, Pakhna, Patti Darapur, Pithnapur, Rajipur, Rathora Mohiuddinpur, Rampur Dafarpur, Ratanpur-Ramana, Roopnagar, Sahaspur, Sankisa Basantpur, Sakwai, Sathra, Sheikhpur Khajoori,

Sherpur, Sarai, Sharfabad, Sikandarpur Naruliya Vinayak,
 Siroli, Sitauli, Siya, Swasi, Tajpur, Tera Akbarpur, Timrua,
 Ugarpur, Ukehrha (all from Farrukhabad tahsil), Adampur Umed,
 Alehnapur, Alinagar, Almapur, Gahlot, Anibhoj, Aseh, Ayubpur,
 Balandpur, Bangawan, Barauli, Bibipur, Bikupur, Bilandpur
 Kharagpur, Bhagwantpur, Bhawargarha, Brahmaipur Nizampur,
 Chandarpur, Dalupur Sultanpur, Daulatabad, Gadaura, Gadnapur
 Qazi, Garhiya, Gangaganj Gurauli, Ghiloyar Khas, Gorakhpur
 Harbhampur, Gyanpur, Harballabhpur, Jarihpur, Kasawa,
 Khiriya, Kishai Jagdeeshpur, Kishunpur Basant, Kunwarpur
 Banwari, Kunwarpur Junu, Lakh, Madaripur Kasawa, Marhi,
 Mighauli, Mohiuddinnagar, Mundala, Narmau, Nauli, Nek
 Rampur, Pangawan, Phoolanpur, Rasoolpur, Rooppur, Salempur,
 Sardapur, Sakatpur, Sakarbara Bagulai, Sarai Prayag,
 Shareefabad, Shareefpur, Teor, Udhimpur, Usmanpur (all
 from Chhibrampur tahsil); Agaus, Anogi, Baherapur, Gaisapur,
 Baisapur Patti, Badanpur Veerhar, Baramau Bangar, Bhadausi,
 Bhunna, Chachasanda, Chandiapur, Chandauli, Chaudhriyapur
 Kachhoha, Dayeepur, Daryapur Chandai, Fatehpur Kapoorapur
 Gugrapur Bangar, Gasaidaspur, Hameerpur, Maraipur, Harballa-
 bhpur, Hisamuddinpur, Jalalabad Amra, Jankhat, Jasauli,
 Jaspurapur, Jeewan, Khama, Khurrampur, Kurhina, Kusumkhor
 Bangar, Liluiya, Ichamark, Matauli, Mehdipur, Mirgawan,
 Nera, Paindabad, Paithana, Rampur Majhila, Sadhiapur Bangar,
 Sahillapur, Sarotop, Sataura, Sarsai, Sausari, Sursi,
 Simiriya, Tijlapur and Tirchrasra (all from Kannauj Tahsil).